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Significant Actinide and Daughter Activities from the HTGR Fuel Cycle

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SIGNIFICANT ACTINIDE AND DAUGHTER ACTIVITIES FROM THE HTGR FUEL CYCLE

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SIGNIFICANT ACTINIDE AND DAUGHTER ACTIVITIES FROM THE HTGR FUEL CYCLE

by

G. L. SIMMONS

M. L. GRITZNER

SEPTEMBER 1975

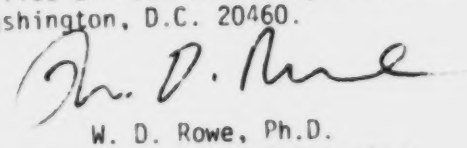
U.S. ENVIRONMENTAL PROTECTION AGENCY
Technology Assessment Division
Radiation Source Analysis Branch
Office of Radiation Programs
Washington, D.C. 20460

FOREWORD

The Office of Radiation Programs carries out a national program designed to evaluate the exposure of man to ionizing and nonionizing radiation, and to promote the development of controls necessary to protect the public health and safety and assure environmental quality.

Office of Radiation Programs technical reports allow comprehensive and rapid publishing of the results of intramural and contract projects. The reports are distributed to groups who have known interests in this type of information such as the Nuclear Regulatory Commission, the Energy Research and Development Administration, and State radiation control agencies. These reports are also provided to the National Technical Information Service in order that they may be readily available to the scientific community and to the public.

Comments on this analysis as well as any new information would be welcomed; they may be sent to the Director, Technology Assessment Division (AW-459), Office of Radiation Programs, U.S. Environmental Protection Agency, Washington, D.C. 20460.



W. D. Rowe, Ph.D.
Deputy Assistant Administrator
for Radiation Programs

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1. INTRODUCTION AND SUMMARY

1.1 BACKGROUND

The advent of a viable nuclear power industry has given rise to a rapidly increasing volume of spent fuel and attendant fission products. The high specific activities associated with these materials and the potential biological and ecological consequences of their disposition creates the need for environmental guidelines and standards. Serious questions have been raised as to the feasibility for several modes of long term or "permanent" storage of these large volumes of radioactive wastes. Near term maintenance and engineered storage can be evaluated on the basis of present technology. However, long term effects of stored waste and inadvertent releases, beyond the control of the next few generations, is of greater concern.

When considering the radiological consequences of spent fuel storage or reprocessing, the major near term effects can be attributed to the short lived fission product content. However, when looking at long term considerations even such relatively long lived fission products as Cs-137 (30 year half-life) and Sr-90 (28 year half-life) have decayed significantly and the transuranic actinides become the predominant concern. These actinides* possess a characteristically long half-life and much of their resultant build-up and decay cannot be seen in short time periods of, say, less than ten years. The decisions made with regard to spent fuel recycle, fast breeder utilization, and reprocessing operations can play a significant role in the long term concentrations which will result in the environment. This role may not be immediately obvious to those in charge of such decisions and environmental regulations and guidelines are being formulated to minimize the environmental consequences of actinide buildup over the long term

*Throughout this report the term actinide refers to "actinides and their daughters.

In order to assist the Office of Radiation Programs (ORP) in its standards setting activities related to the consequences of actinide buildup in the environment, a data base of actinide concentrations produced by nuclear reactors as a function of decay time was judged to be useful. The first ORP data base which satisfied this requirement was published[1] in October 1974 and concerned the actinides produced by the light water reactor (LWR) fuel cycle and the liquid metal fast breeder (LMFBR) fuel cycle. The second ORP data base, the subject of this report, concerns the High Temperature Gas Cooled Reactor (HTGR) fuel cycle. Most notably, the LWR and LMFBR concepts are based on a uranium/plutonium fuel, whereas, the HTGR, as currently envisioned, is based on a uranium/thorium fuel cycle.

1.2 SUMMARY

The Office of Radiation Protection of the Environmental Protection Agency has commissioned SAI Services, a Division of Science Applications, Inc. to undertake a study of the significant actinides which are expected to be produced by a High Temperature Gas Cooled Reactor. Because the HTGR industry is in its infancy, it is realized that this study will require updating as the industry matures. In order to estimate the quantity of actinides produced in the HTGR the most likely fuel cycle schemes are considered. These schemes are:

- Initial cores for the HTGR consisting of 93.5 w/o Uranium 235 and natural thorium;
- "Equilibrium" cores for the HTGR consisting of fuel elements made from 93.5 w/o Uranium-235, recycle Uranium-235 recovered during reprocessing, Uranium-233 produced in the thorium seed, and natural thorium;

- "Advanced fuel cycles" which utilize plutonium produced in a light water reactor as a replacement for the highly enriched Uranium fuel elements in the "equilibrium" fuel cycle.

The use of plutonium in the HTGR is not a new concept, but the inclusion of this mechanism for utilization of plutonium serves as a useful data base for comparison with the LWR and LMFBR fuel cycles.

The principle output of this study consists of a series of graphs and tables which depict the actinide concentrations in various streams of the HTGR fuel cycle. These data are presented graphically for five time periods of interest. All data are relative to the cooling period of 180 days after removal from the reactor. These time periods are:

1) 1 to 100 years
2) 1 to 1000 years
3) 1 to 10,000 years
4) 1 to 100,000 years
5) 1 to 10^8 years.

The sources of actinides considered are the spent fuel, high level wastes, and recovered uranium. The combination of fuel cycles, time periods, and sources results in a total of 45 graphs and 9 tables.

The following sections of this report present the basic assumptions for the study and the mechanism used for calculating the data that is presented.

Table 1. Characteristics of Model HTGR

Reactor Output	3000 MW(t)
Electrical Output (net)	1160 MW(e)
Overall Station Efficiency	38.6 %
Core Diameter	8.41 m
Active Core Height	6.30 m
Number of Fuel Elements	3944
Fuel Column Pitch	361 mm
Total Quantity of Thorium	37,500 kg (initial core)
Total Quantity of Uranium	1,725 kg (initial core)
Uranium Enrichment	93.5%
Fuel Burnup	94,200 MWD/Ton*
Fuel Element Life Time	4 years
Load Factor	80%
Core Inlet Temperature	316°C
Core Outlet Temperature	741°C
Maximum Fuel Temperature	1410°C

*(U & Th)

refabrication of recycle fuel. Except for the case of plutonium utilization in the HTGR, three fuel particles require fabrication: 1) fissile particles; 2) fertile particles; and 3) recycle particles. The characteristics of each particle are given in Table 2.

Table 2.
Characteristics of Fissile, Fertile and Recycle Particles
for HTGR Fuel Elements

	Fissile Particle	Fertile Particle	Recycle Particle
Composition	$^{235}UC_2$	ThO_2	$(Th, ^{233}U)O_2$
Th to U Ratio	--	--	4.25
Kernel Diam, μm	200	500	400
Coating Thickness, μm			
Buffer	85	85	90
Inner Dense Coating	25	--	
Silicon Carbide	25	--	
Outer Dense Coating	35	75	80
Total Particle Diameter, μm	540	820	740

In the fissile particle preparation, uranium oxide (93.5 w/o ^{235}U) granules are high fired converting the UO_2 to UC_2. The UC_2 particles are spheroidized in high temperature vacuum furnaces in preparation for coating. The UC_2 microspheres are loaded into a fluid-bed reactor and the temperature is then raised to the required level. The microspheres are suspended by passing a diluent and hydrocarbon gas (acetylene, propane, and propylene are used) up through the bed. The hydrocarbon gas dissociates, producing free carbon and the free carbon then deposits on the suspended particles. Temperature and the

hydrocarbon gas are selected to deposit a coating with the desired properties. The buffer, seal, and low temperature isotropic coatings are similarly applied. Silicon carbide is applied over the low temperature isotropic carbon coating by passing methyltrichorosilane through the bed as in the case of the hydrocarbon gas. The final low temperature carbon coating is applied over the silicon carbide coating in a similar manner. The preparation of the fertile thorium oxide particle is quite similar to the process required for preparation of fissile particles. Two types of recycle fissile particles are expected to be produced.[4] The ^{233}U obtained from irradiated fertile particles will be made into a mixed oxide particle, (Th, $^{233}U)O_2$. The ^{235}U recovered from irradiated fissile particles will be made into UO_2 particles. The ^{233}U must be fabricated in the shielded facilities of the recycle plant because the contained ^{232}U gives rise to gamma-emitting decay products. Although remote fabrication of recycled ^{235}U may not be necessary, the presence of high-specific-activity alpha emitters may require it. Microspheres containing a mixture of thorium and ^{233}U oxide are expected to be prepared by what is technically known as a sol-gel process[5]. In the first step of this sol-gel process, the ^{233}U oxide feed material is dissolved in nitric acid and mixed with $Th(NO_3)_4$ to form a nitrate feed solution with the required proportions of thorium and uranium. For this study, a ratio of 4.25 parts thorium to one part uranium was assumed. The nitrate will then be extracted from the nitrate solution with an amine solution to form a $(Th, U)O_3$ sol. Spherical gel particles of ThO_2-UO_3 will be formed by injecting droplets of the sol into a water-removing organic solvent contained in a vertical column. After water removal, the microspheres will be reduced to $(Th, U)O_2$ and sintered to greater than 95% of theoretical density in an electric furnace.

The (Th, $^{233}U)O_2$ microspheres will be coated with two layers of pyroltyic carbon. The first layer, which is the low-density (~1.0 g/cm^3) buffer coating, is applied by passing a mixture of acetylene and inert gas (helium or argon) through a fluidized bed of particles at about 1450°C. The hydrocarbon gas decomposes, depositing a layer of carbon on the microspheres. The second layer, which is a high-density (~1.9 g/cm^3) impermeable coating, is deposited by the decomposition of propylene.

Microspheres of $^{235}UO_2$ will be prepared by another sol-gel process[6]. The preparation of these microspheres is very similar to the preparation of the (Th, $^{233}U)O_2$ microspheres just described. The recycle $^{235}UO_2$ microspheres will be coated in the same manner as the (Th, $^{233}U)O_2$ microspheres described above except that a SiC layer will be sandwiched between two layers of the high-density pyrolytic carbon. SiC is deposited by passing a mixture of methyltrichlorosilane and hydrogen through a fluidized bed of particles at about 1650°C.

A fuel stick is then fabricated (molded) by mixing appropriate quantities of the uranium bearing microspheres with fertile thorium microspheres and embedded into a carbon matrix approximately 5/8 inches in diameter and 3 inches in length. These fuel blocks are then loaded into hexagonal blocks of nuclear grade graphite. These large blocks are the fuel elements which are stacked to form the reactor core. Ideally, each fuel block contains only one type of uranium bearing fuel and the stacking of blocks allows for flexibility in shaping the axial power distribution by using the different fissile content in each fuel block. A typical fuel element contains approximately 9.95 kg of heavy metal (U + Th).

2.2 FUEL CYCLE ANALYSIS

The goal of this study is to obtain graphical representations of the actinide activity associated with three HTGR fuel cycles. In order to accomplished this goal, several calculations were performed using the ORIGEN[7] computer code. Briefly, ORIGEN is a versatile point depletion code which solves the equations of radioactive growth and decay for large numbers of isotopes with arbitrary coupling. The code uses the matrix exponential method to solve a large system of coupled, linear, first-order ordinary differential equations with constant coefficients. The general nature of the matrix exponential method permits the treatment of complex decay and transmutation schemes. An extensive library of nuclear data has been compiled, including half-lives and decay schemes, neutron absorption cross sections, fission yields, disintegration energies, and multigroup photon release data. ORIGEN has been used to compute the compositions and radioactivity of fission products, cladding materials, and fuel materials in LWRs, LMFBRs, MSBRs, and HTGRs. Many of the studies involving the use of ORIGEN have been directed toward studying the HTGR fuel cycle[8-11]. The data base used in ORIGEN has been verified against results obtained for a 1000 MW_e HTGR[8]. We should point out, however, that during the course of this study, an error in the ^{233}U fission resonance integral[14] discovered by ORNL was observed. The uncorrected value given in the ORIGEN data base is a factor of 10 too large. The corrected resonance integral was used in this study.

The three HTGR fuel cycles studied each have unique features which will now be discussed. Also information necessary to develop the input data for ORIGEN will be given.

2.2.1 Initial HTGR Cores

The initial cores in HTGR plants will consist of highly enriched uranium (93.5 % ^{235}U) and natural thorium. The basis used in these calculations is one metric ton of heavy metal charged to the reactor. On this basis, 855 kilograms of thorium and 115 kilograms of uranium are charged to the reactor. The fuel is burned over a four-year period at a power density sufficient to produce a burnup of 94,200 MWD/MT(U + Th) and with a flux spectrum given in Reference 3. The fuel is then allowed to decay for a total of 180 days before it enters the next stage in the analysis.

After the cooling period, the fuel is followed through three paths -- spent fuel, high level wastes, and recovered uranium.

Spent Fuel

The spent fuel as discharged from the reactor is allowed to decay for 10^8 years. The tabulation of actinide activities at various times during this period are given in Appendix D.

High Level Wastes

After the fuel has cooled for 180 days, it is shipped to the reprocessing plant and the thorium and uranium is recovered. At the reprocessing plant, the fuel elements are crushed and burned to expose the fissile and fertile microspheres. The microspheres are separated according to size by a screening process. Ideally, the fissile and fertile microspheres would be completely separated. In practice, some of the microspheres will be crushed and will "crossover" into the different streams. We have assumed a separation factor of 99% for the thorium and uranium, with the remainder of these elements and other actinides then forming the "high level waste". The quantity of high level waste is normalized to one kilogram of actinides and allowed to decay for 10^8 years.

Recovered Uranium

The uranium recovered at the reprocessing plant will be used to recycle back into the reactor. Ideally, the ^{233}U would be obtained from the fertile microspheres and the remaining ^{235}U would be recovered from the fissile microspheres. The fissile stream contains large amounts of ^{236}U (~ 55%) which acts as a neutron poison and it is therefore desirable to minimize the amount of crossover between the two process streams. For this reason, the decision of whether to recycle the ^{235}U is largely a question of fuel cycle economics and the method by which the utility chooses to utilize this fuel.

For the case of uranium recovered at the reprocessing plant, we have conveniently normalized the quantity of recovered uranium to one kilogram and then allowed this amount to decay for 10^8 years. The tabulation of the actinide activity during this time period is given in Appendix D.

2.2.2 Equilibrium Fuel Cycle

The most likely fuel utilization scheme in the HTGR[10] is based on charging three types of fuel into the reactor, once an "equilibrium cycle has been reached. These fuels are initial core fuel, recycle U-233 fuel, and recycle U-235 fuel. For this study, we have assumed the feed compositions in Ref. 10, normalized to one metric ton. These compositions are given in Table 3. The fuel was irradiated for four years to a burnup of 94,200 MWD/MT(U + Th). A cooling period of 180 days was allowed before reprocessing. For the remainder of the fuel cycle, the assumptions given in Section 2.2.1 were used. The tabulation of the actinide inventory from 1 to 10^8 years for spent fuel, high level wastes, and recovered uranium are given in Appendix D.

Table 3. Composition of HTGR Equilibrium Cycle Fuel

Nuclide	Fuel Composition % Initial Fuel	Recycle U-233	Recycle U-235
^{232}U		0.03	3×10^{-6}
^{233}U		55.4	--
^{234}U		23.3	0.03
^{235}U	93.5	9.5	21.9
^{236}U		11.5	55.8
^{238}U	6.5	0.3	22.3
Total Kilograms (U)	43.49	41.47	9.77
Total Kilograms of Thorium (^{232}Th)		905.28	

2.2.3 Plutonium Cycle in HTGRs

The use of plutonium in the HTGR is a development that would be somewhat preferable to the normal HTGR fuel cycle. Two types of fuel cycles utilizing plutonium appear to be most attractive[12]. These are partial replacement of some or all of the ^{235}U makeup fuel with plutonium and making up the remainder of the fuel from the available ^{233}U recycle fuel. One quarter of the core is replaced at each reloading so that there is a peaking factor due to fuel age and enrichment difference. Adding plutonium to the feed stream brings additional peaking factors due to composition differences among fuel elements of the same age. The product of these peaking factors must be held comparable to peaking in the normal fuel cycle for HTGRs, in order to maintain the core thermal rating.

The second type of cycle that has been offered is the so-called Pheonic fuel cycle. This Pheonic fuel concept is realized in an all-Pu HTGR and is characterized by having only Pu as fissile feed and using a small amount of thorium compared to the normal HTGR. This system can be operated in a single-region loading scheme with a refueling interval of more than 2 1/2 years. Since all the fuel is of the same age, no power peaks between fuel elements will be observed. This first allows an increase in the power density by about 40% above the level of normal HTGRs, and second, eliminates the necessity of having variable flow orifices. The increased power density reduces the number of fuel elements, therefore decreasing the fuel costs.

The case which we have considered to be of interest is the partial Pu loading of the HTGR. The fuel composition suggested by Dahlberg[13] was used and these data are given in Table 4. The fuel was burned to an exposure of 94,200 MWD/MT (U + Th + Pu) over a period of 4 years and then allowed to decay for 180 days before reprocessing. The remainder of the assumptions for the fuel cycle are identical to

those in Section 2.2.1, with the exception that a 99% recovery factor for plutonium in reprocessing was assumed. Tabulations of the significant actinide activity for decay times from 1 to 10^8 years for spent fuel, high level waste, and recovered uranium are given in Appendix D.

Table 4. Composition of Fuel for the Plutonium Cycle in the HTGR

Recycle U-233		Recycle U-235		Plutonium	
Isotope	%	Isotope	%	Isotope	%
^{232}U	0.03	^{232}U	6×10^{-6}	^{238}Pu	1.74
^{233}U	55.39	^{233}U	1×10^{-5}	^{239}Pu	55.8
^{234}U	22.23	^{234}U	0.05	^{240}Pu	24.5
^{235}U	9.53	^{235}U	21.78	^{241}Pu	13.1
^{236}U	11.51	^{236}U	54.87	^{242}Pu	4.8
		^{238}U	23.3		
Total (kg)	32.39		3.79		73.61
Total (kg) of Thorium (^{232}Th)			890.31		

3. PRESENTATION OF RESULTS

The results of this study are a series of tables and graphs which present the significant actinide activity for each component of the fuel cycles studied. These data are organized into four Appendices. Appendices A, B, and C contain graphs of the significant actinide activity for the fuel cycles - initial HTGR cores, equilibrium HTGR cores, and plutonium HTGR cores - respectively. Each of these appendices are divided into three sections of five graphs each. Each section presents data for the spent fuel, high level wastes, and recovered uranium. The five graphs within each section show the actinide activity for the time periods from 1 to 100, 1,000, 10,000, 100,000, and 10^8 years, respectively.

For this study, isotopes which contribute significantly to the total actinide activity are defined to be those isotopes which at any time contribute at least 1% of the total activity at that time. Only these isotopes are shown in the plots. However, all actinide activities considered are listed in the tables in Appendix D.

In presenting the data on the graphs, we have included those isotopes which are in secular equilibrium in categories which are labelled A thru E. Those isotopes in each category are given in Table 5. The data plotted is for a single isotope, not the total.

Appendix D is organized in a manner similar to Appendices A, B, and C. The actinide activities for each component of the fuel cycles studied are given at 20 time periods from 1 to 10^8 years. All time periods are relative to the time of fuel shipment to the reprocessing plant, i.e., after a 180-day cooling period.

Table 5. Categories of Isotopes as Shown on Graphs

A	B	C	D	E
^{210}Pb	^{226}Ra	^{229}Th	^{227}Ac	^{228}Th
^{210}Bi	^{222}Rn	^{225}Ra	^{227}Th	^{224}Ra
^{210}Po	^{218}Po	^{225}Ac	^{223}Ra	^{220}Rn
	^{214}Pb	^{221}Fr	^{219}Rn	^{216}Po
	^{214}Bi	^{217}At	^{215}Po	^{212}Pb
	^{214}Po	^{213}Bi	^{211}Pb	^{212}Bi
		^{213}Po	^{211}Bi	
		^{209}Pb	^{207}Tl	

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The authors would like to thank the project officers at the Environmental Protection Agency's Office of Radiation Programs, T. W. Fowler and W. Hansen, for many profitable discussions during the course of this study. We also wish to thank Ms Deborah Osment who typed and edited this manuscript.

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APPENDIX A

GRAPHS OF ACTINIDE ACTIVITY FOR INITIAL HTGR CORES

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Figure A-1. Significant Actinide Activity In HTGR Initial Core Spent Fuel For The Period From 1 to 10^8 Years

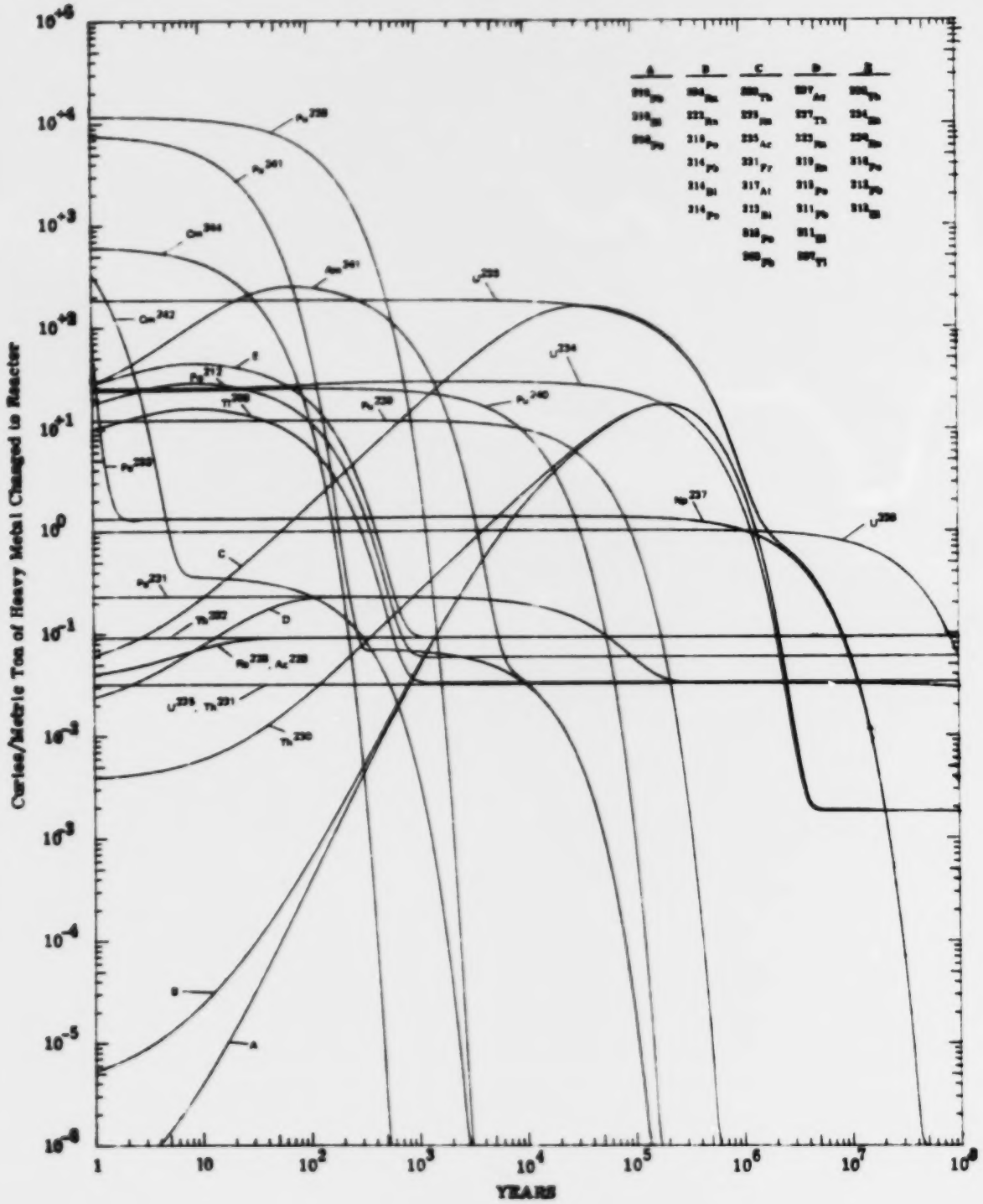
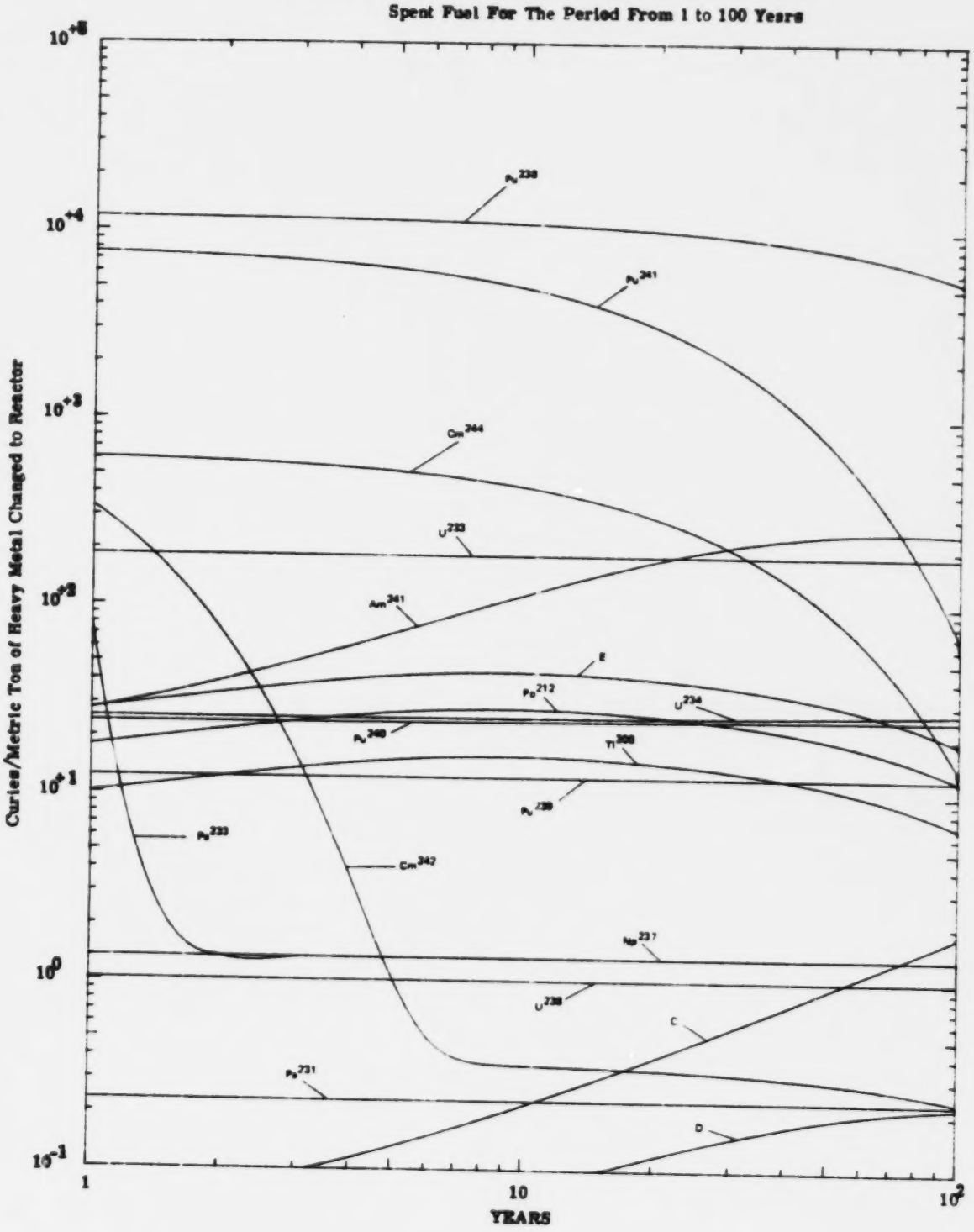


Figure A-2. Significant Actinide Activity In HTGR Initial Core Spent Fuel For The Period From 1 to 100 Years



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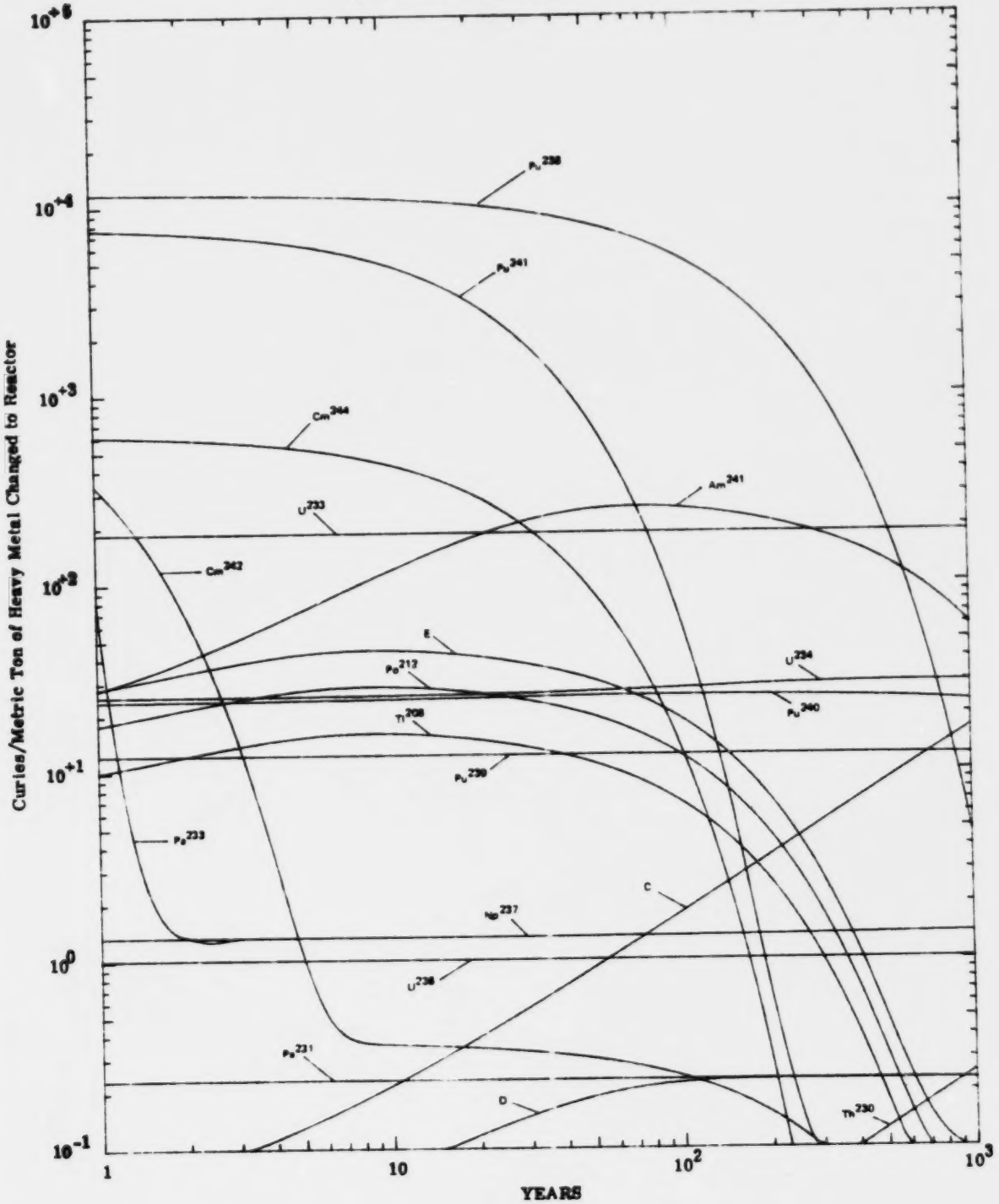

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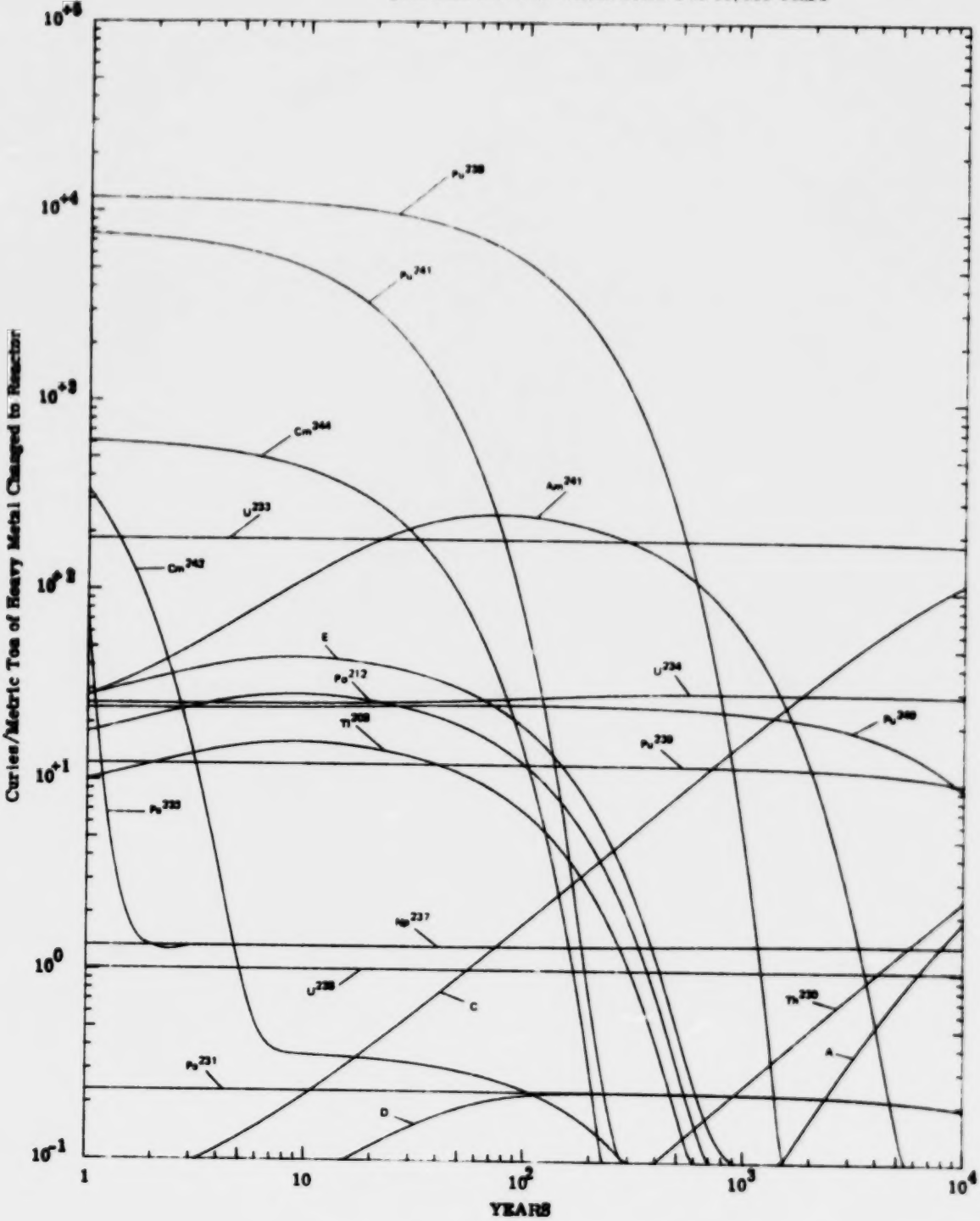

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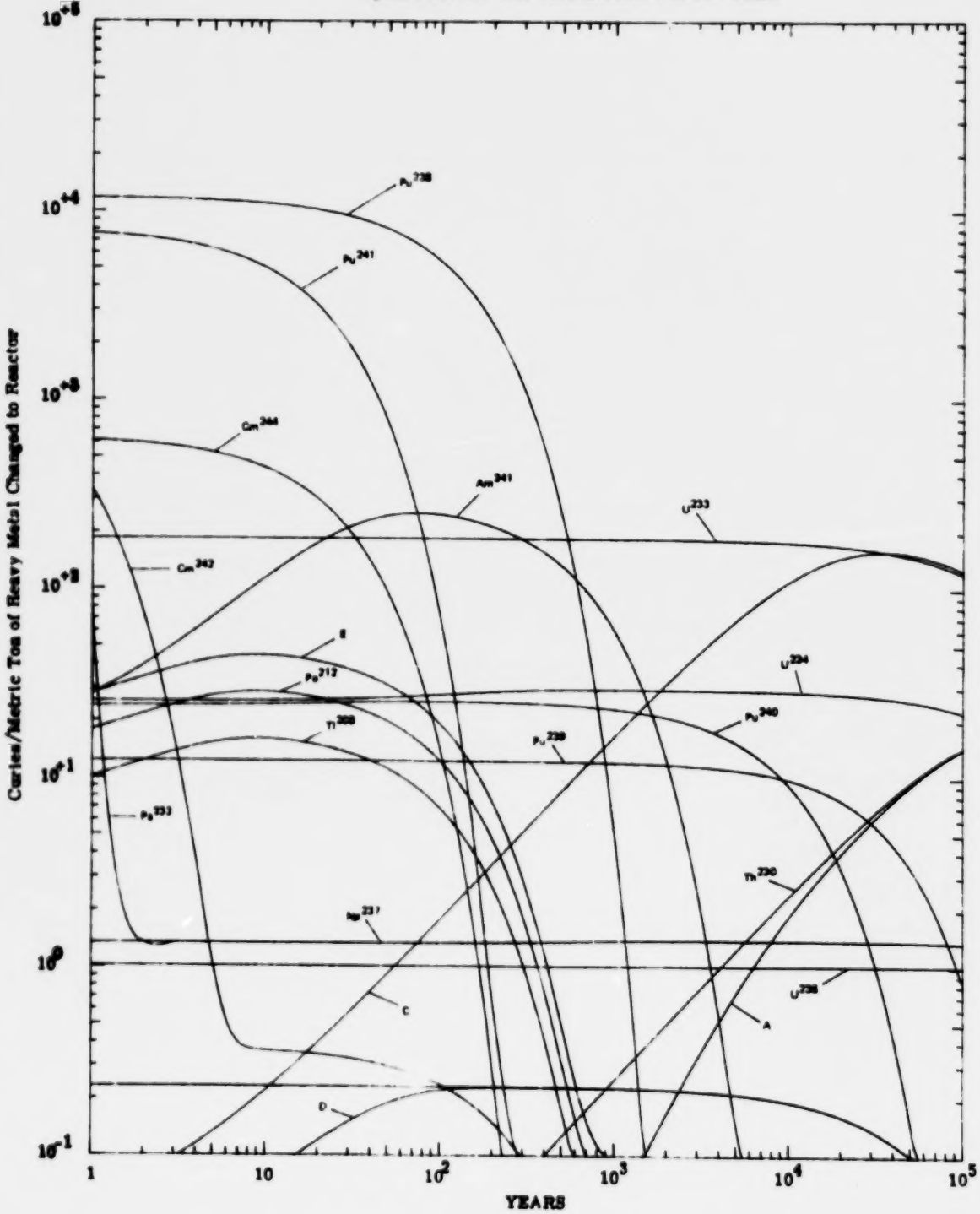

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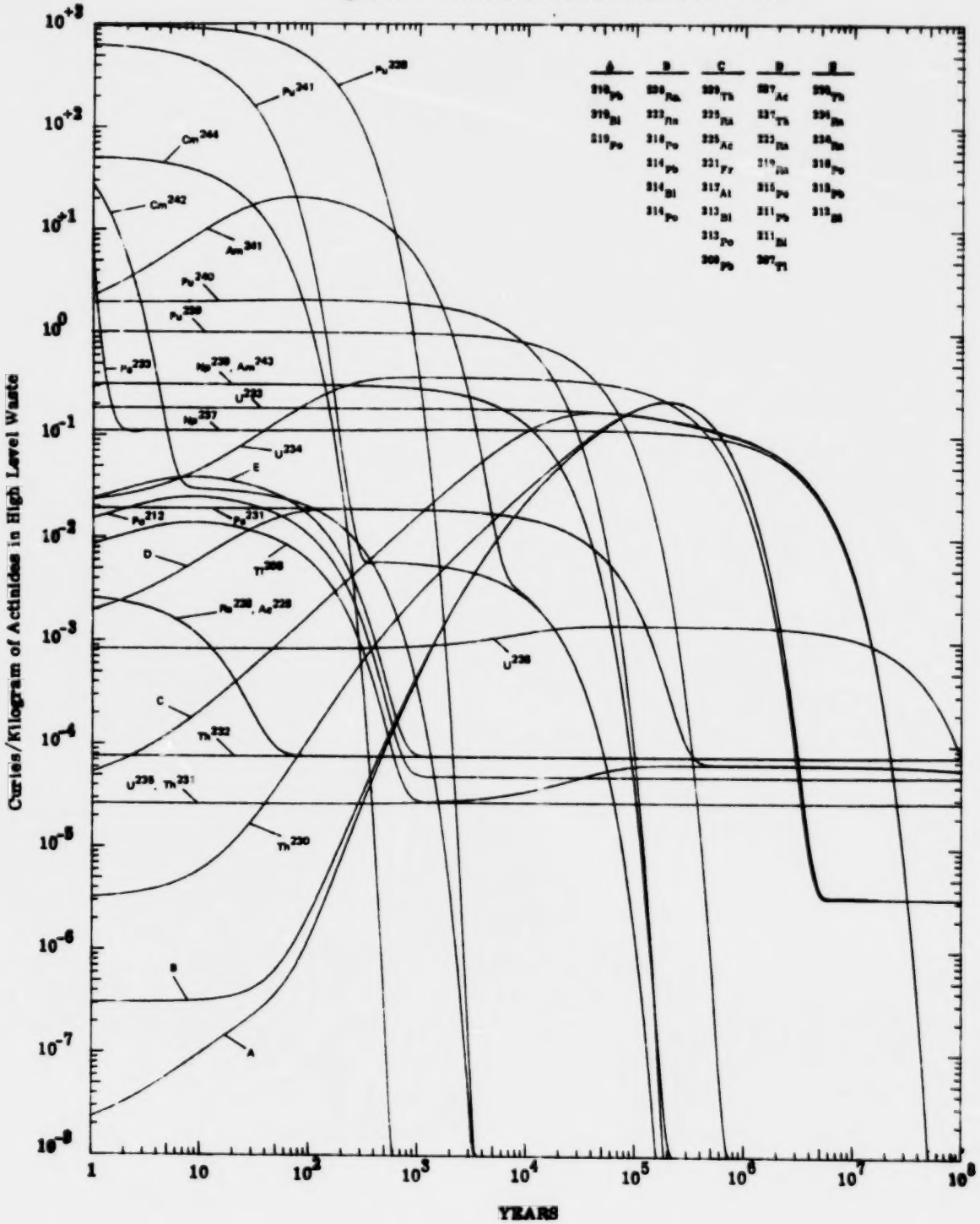

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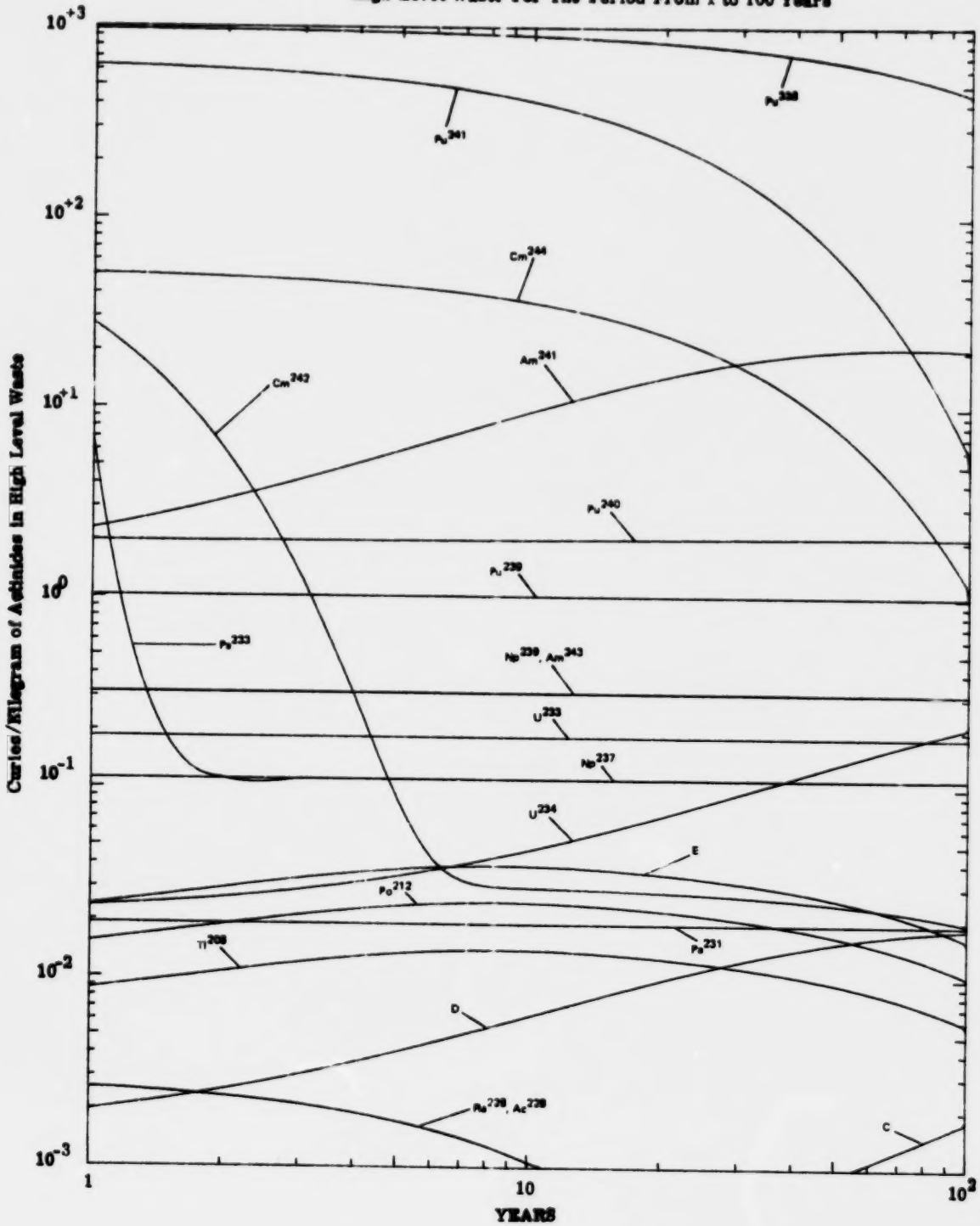

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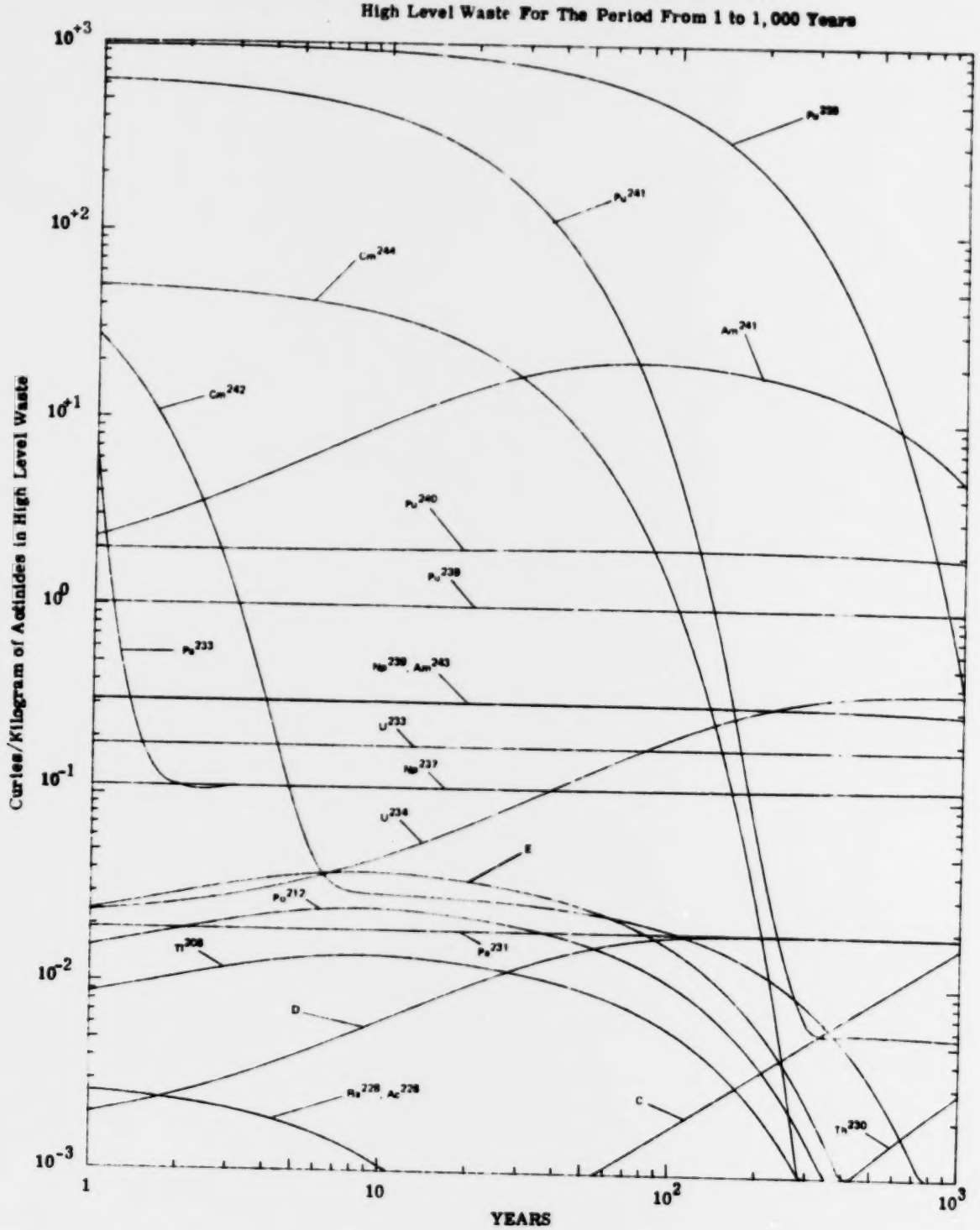

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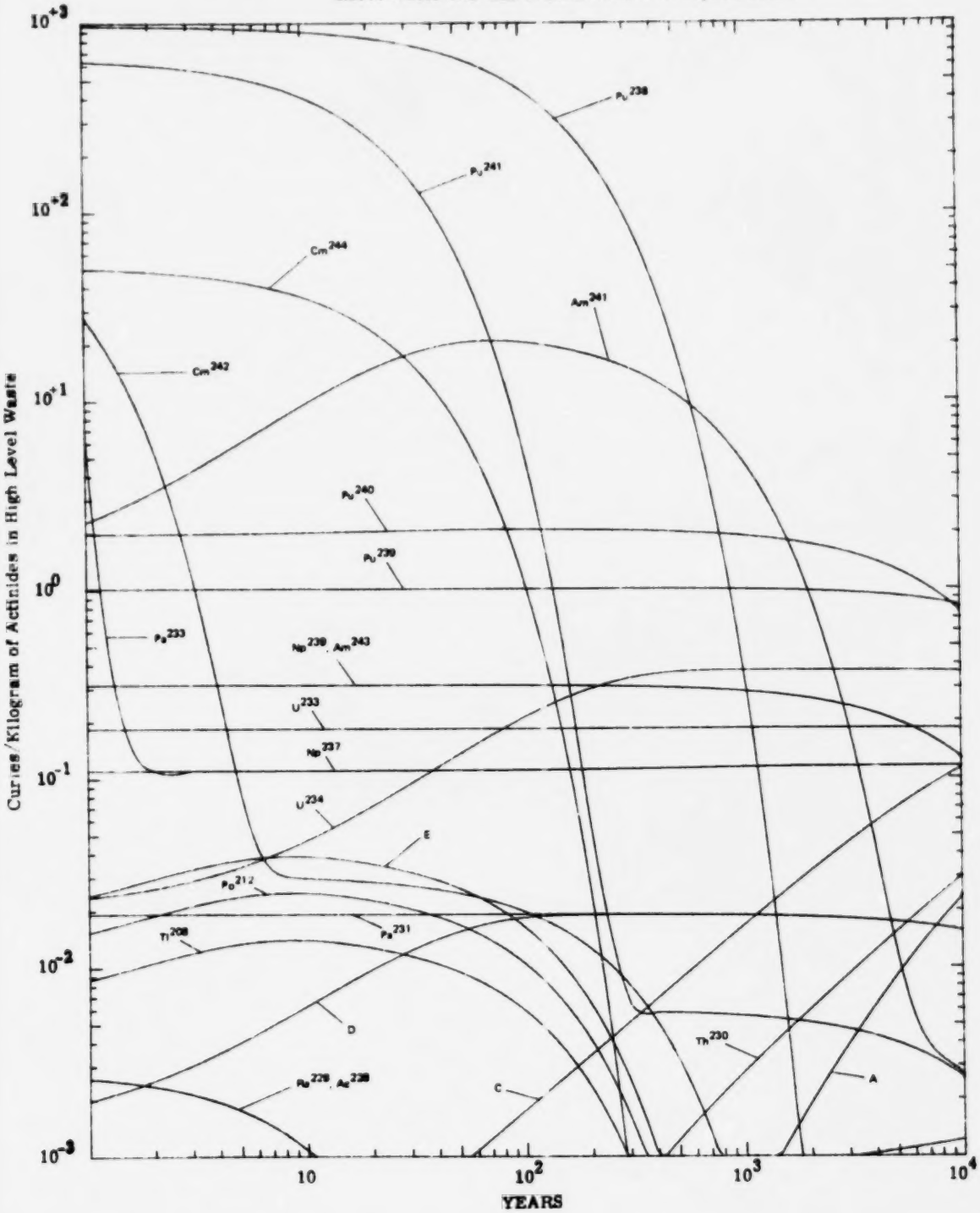

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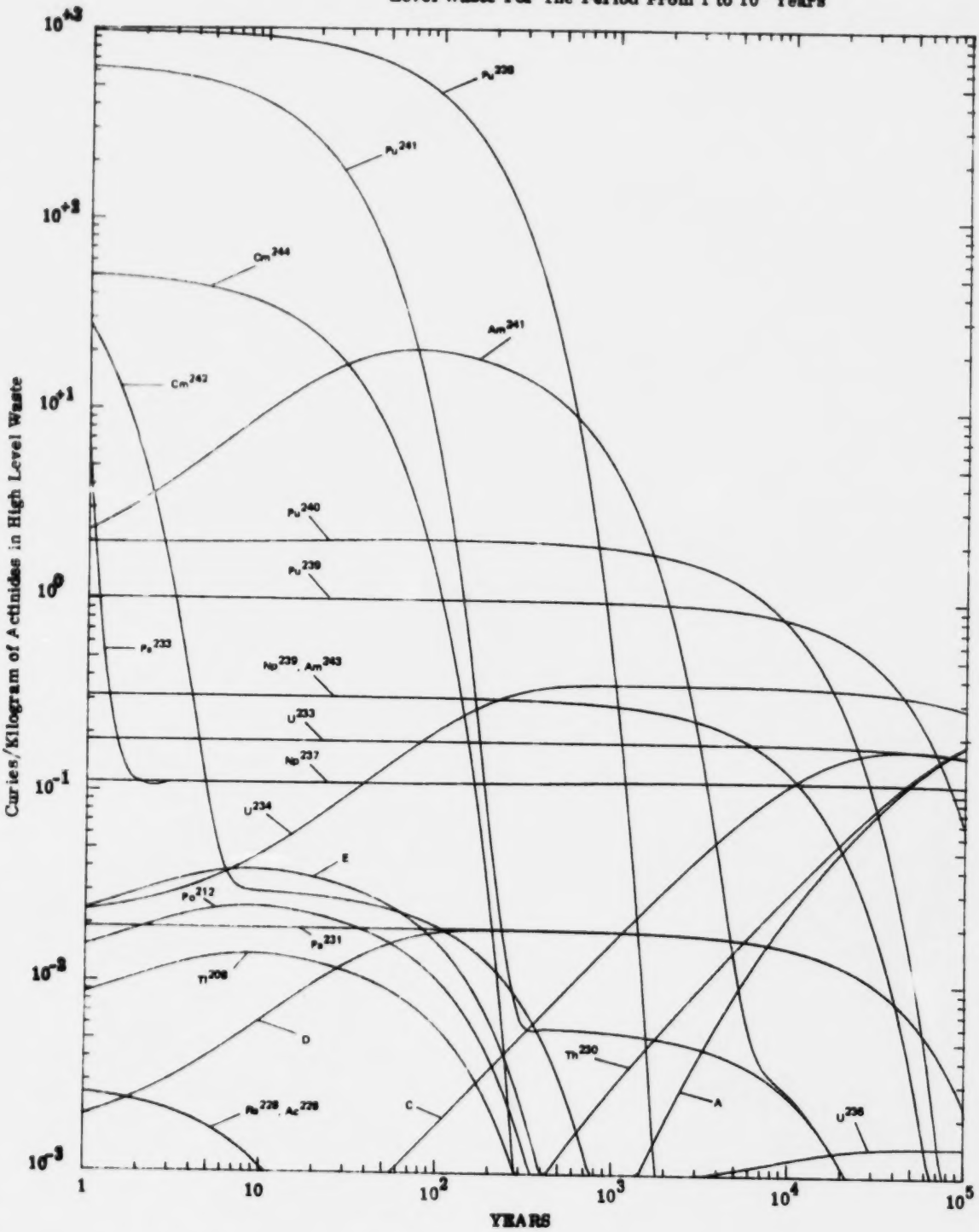

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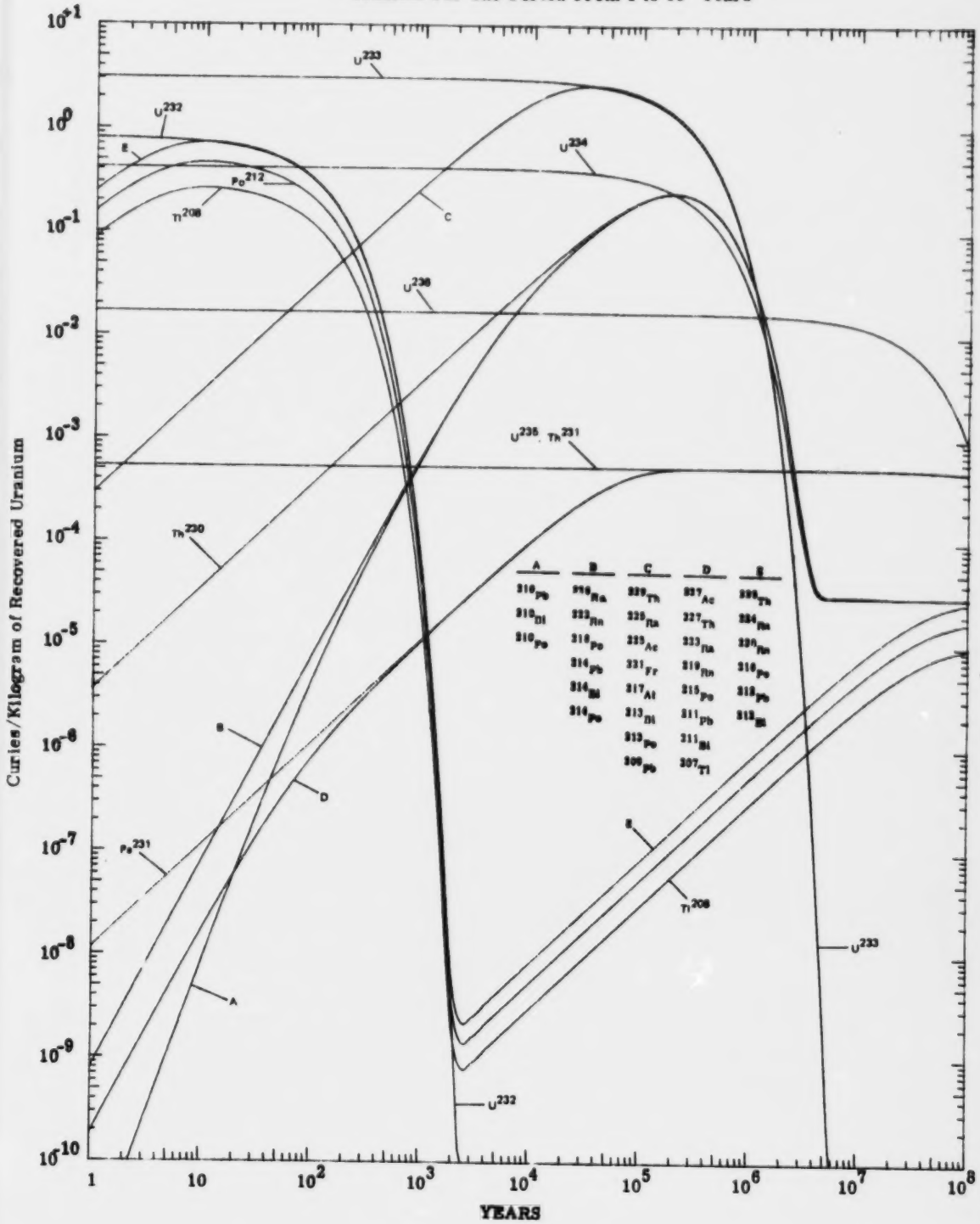

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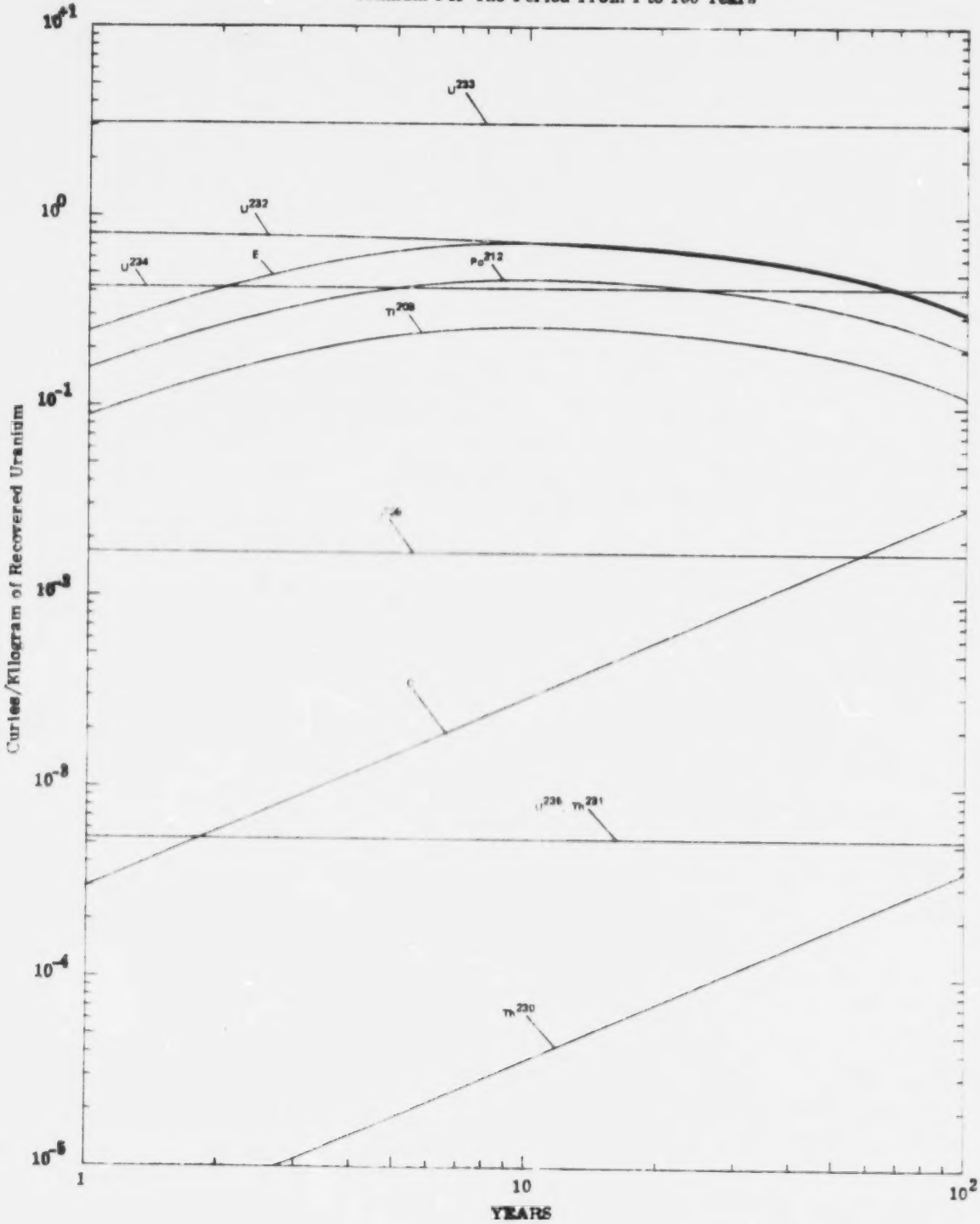

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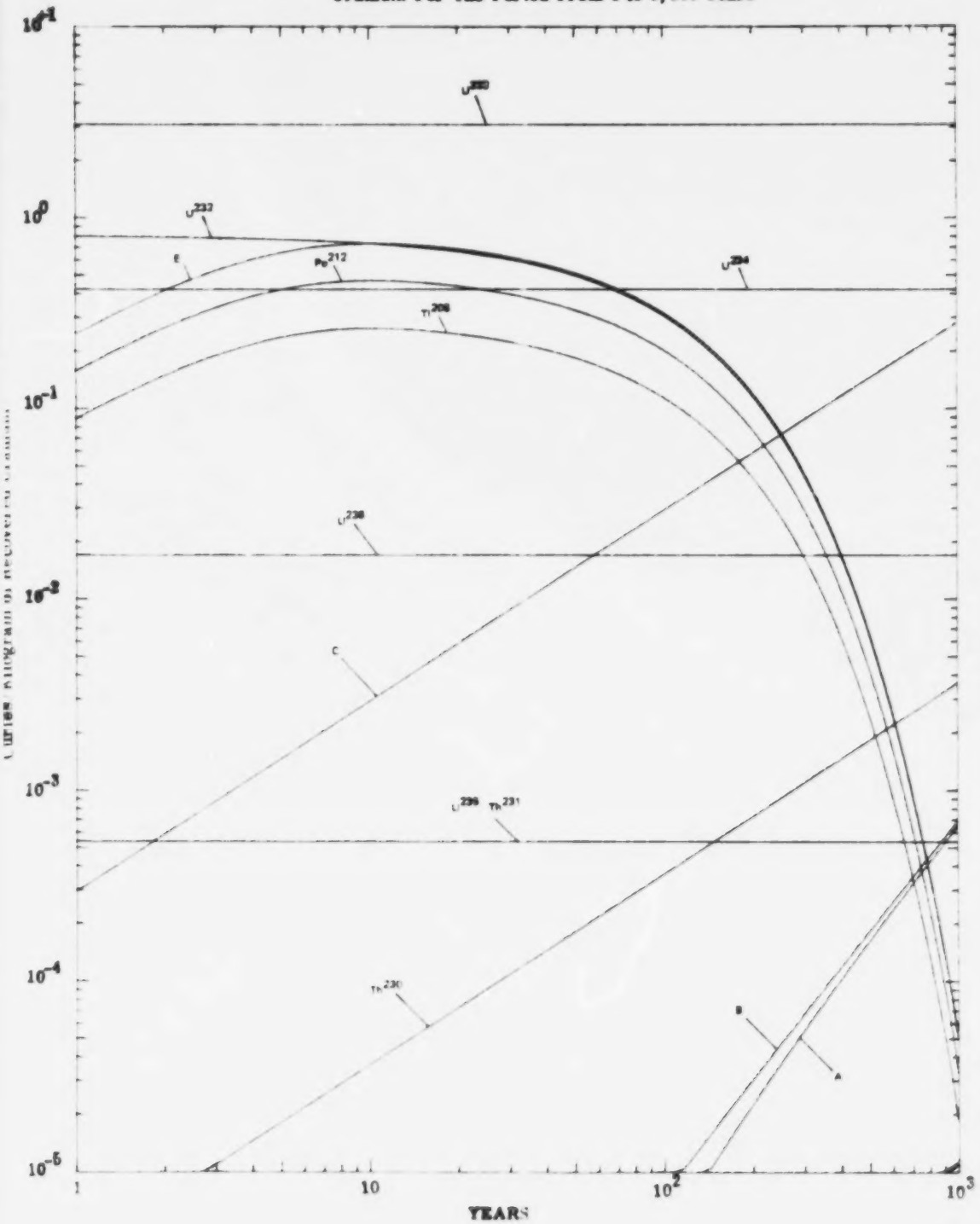
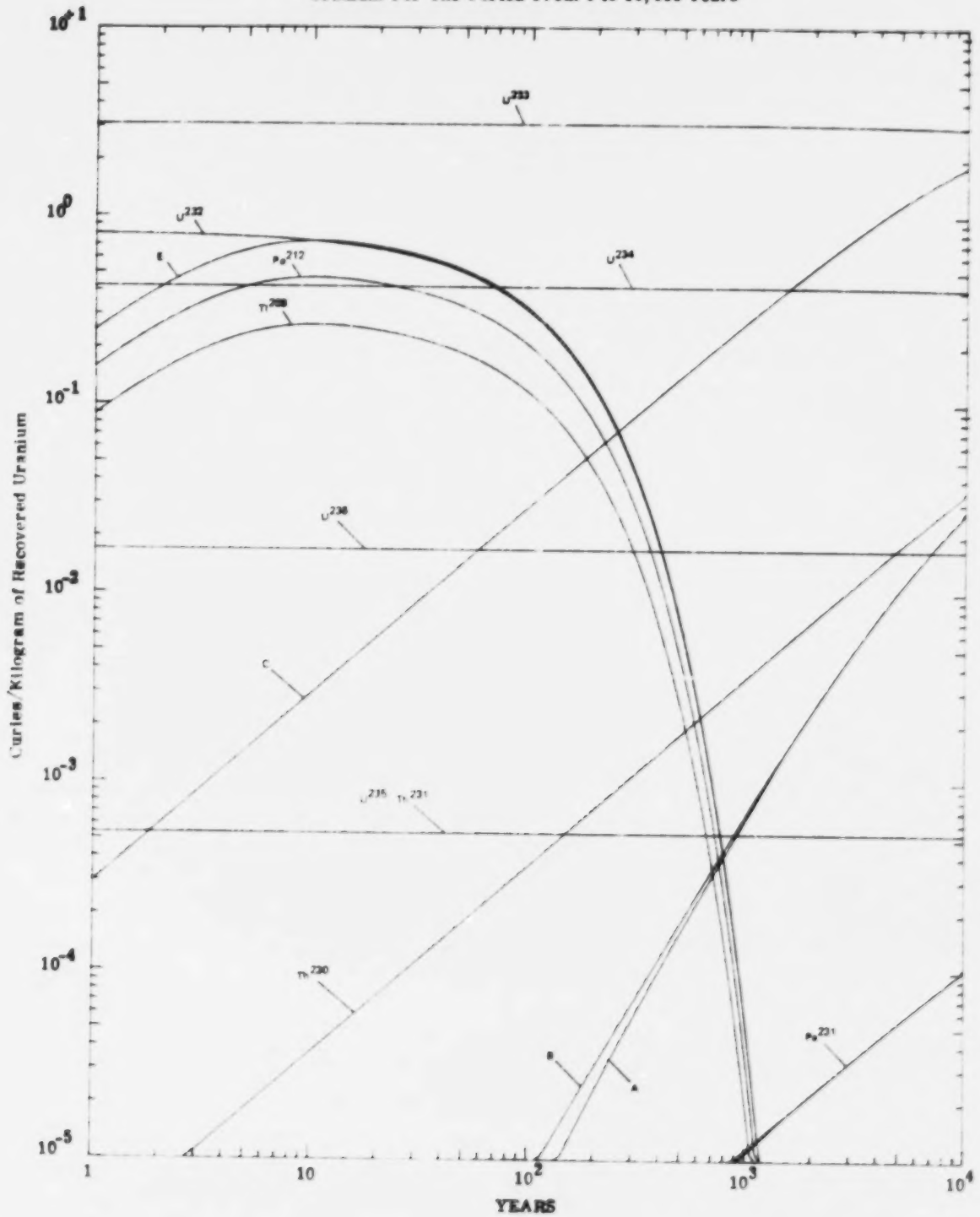


Figure A-14. Significant Actinide Activity In HTGR Initial Core Recovered Uranium For The Period From 1 to 10,000 Years



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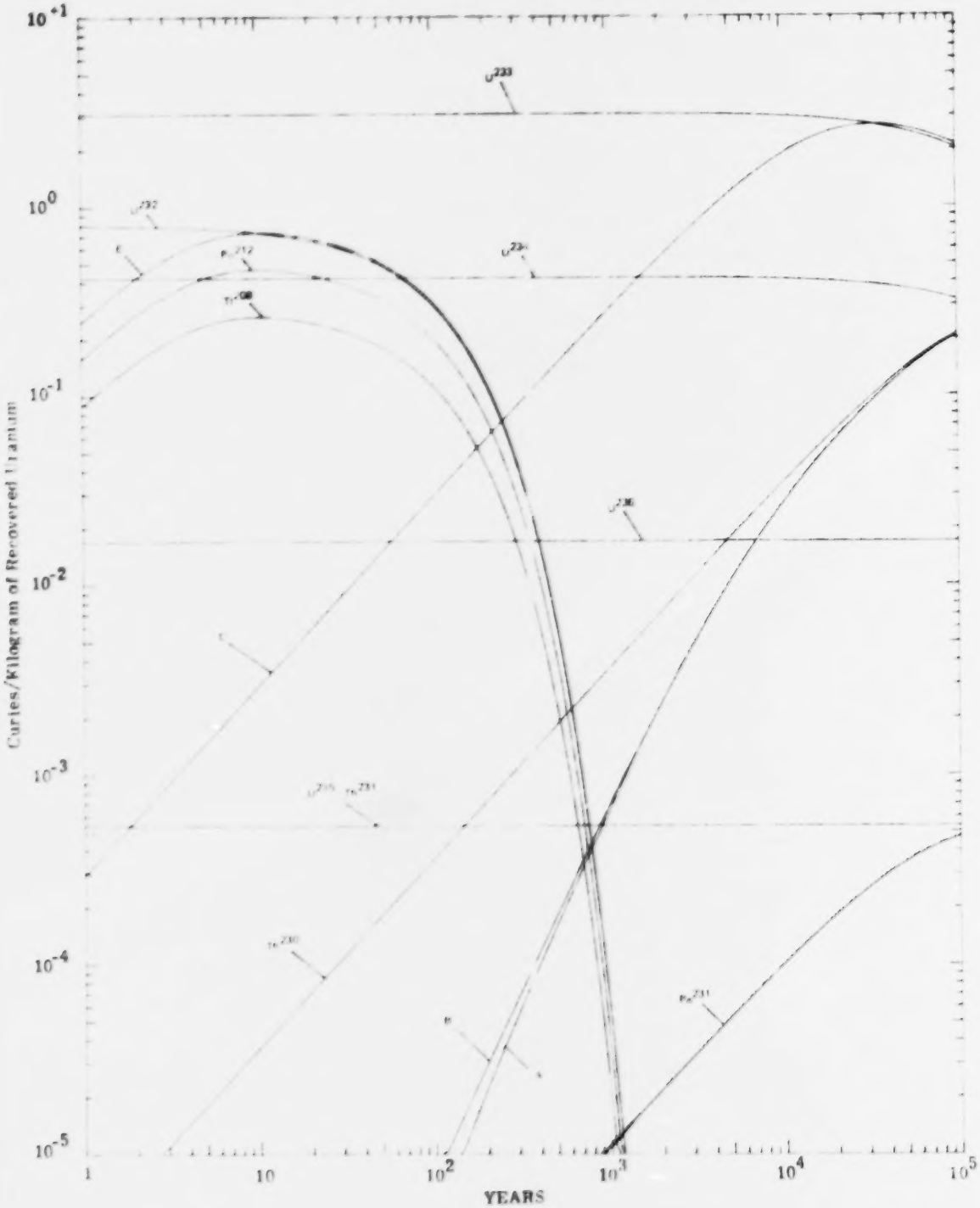

APPENDIX B

GRAPHS OF ACTINIDE ACTIVITY FOR EQUILIBRIUM CYCLE HTGR CORES

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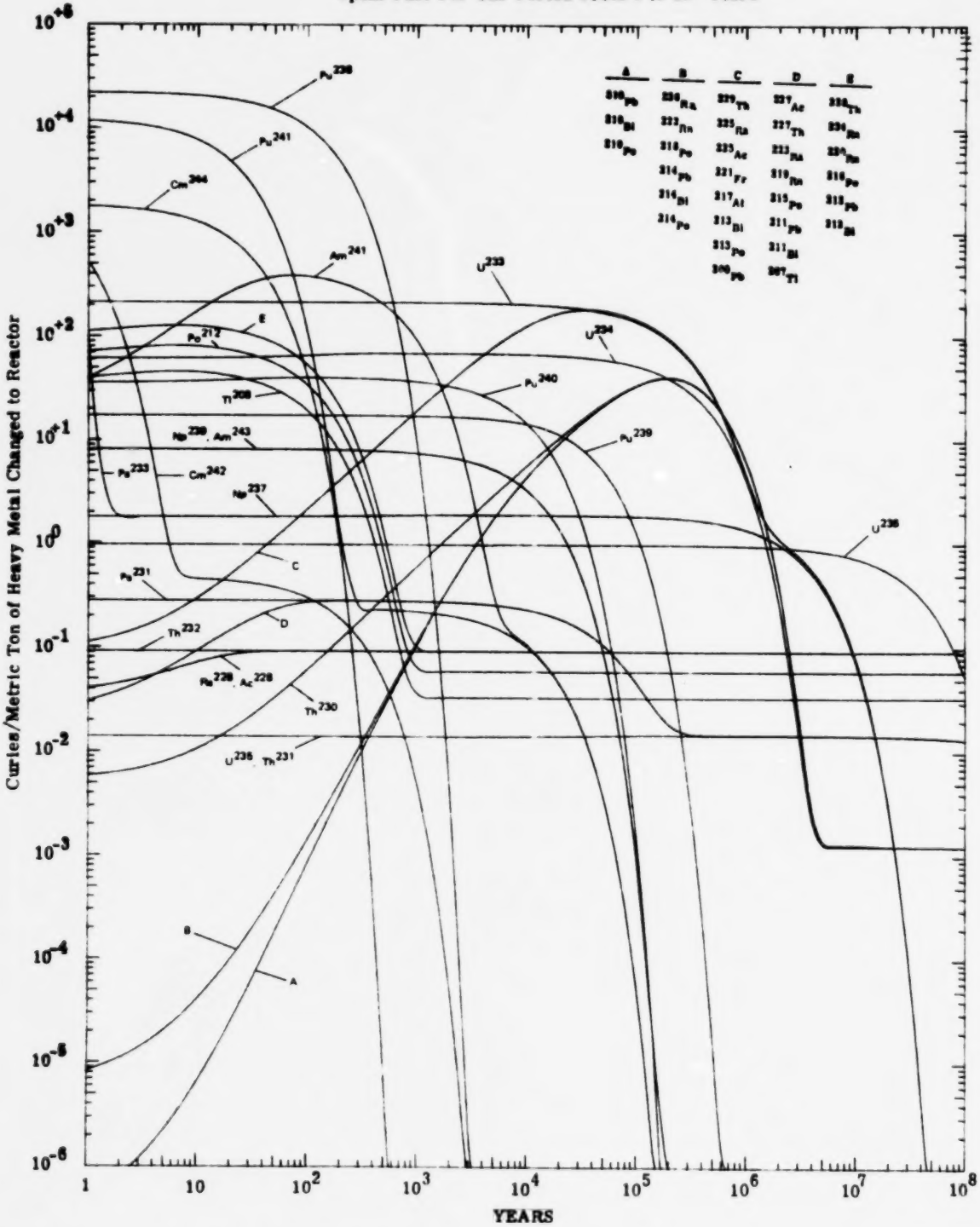

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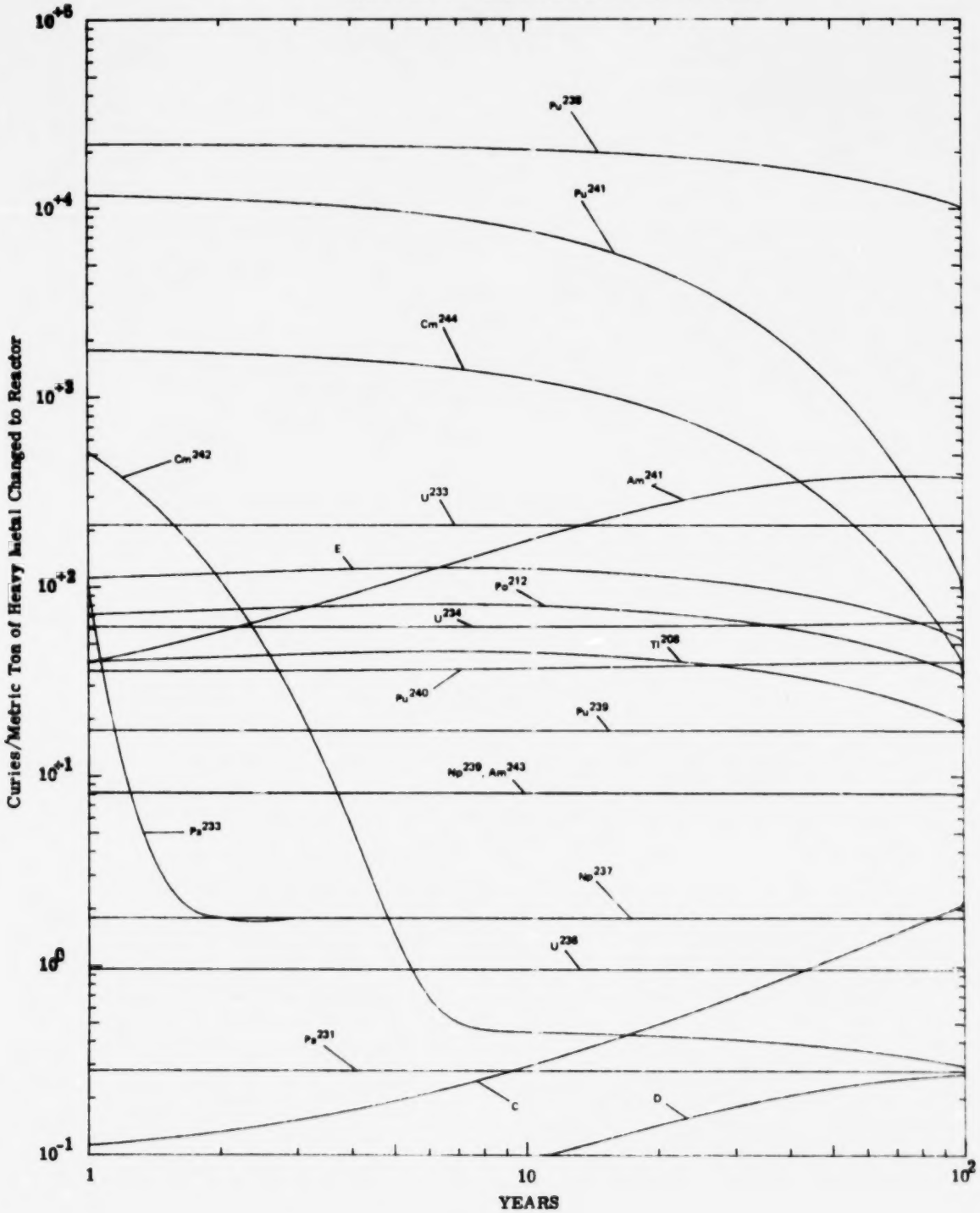
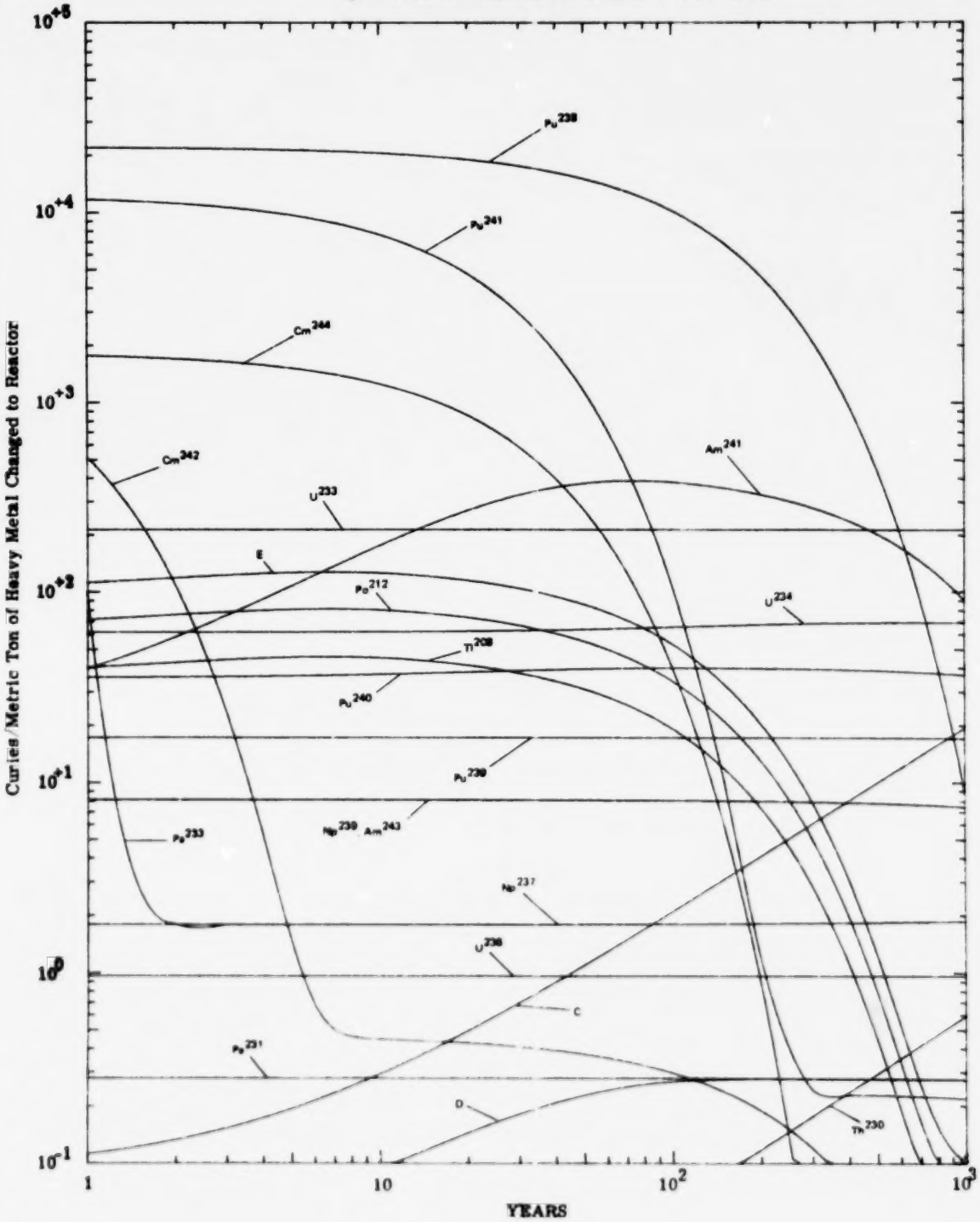


Figure B-3. Significant Actinide Activity In HTGR Equilibrium Core Spent Fuel For The Period From 1 to 1,000 Years



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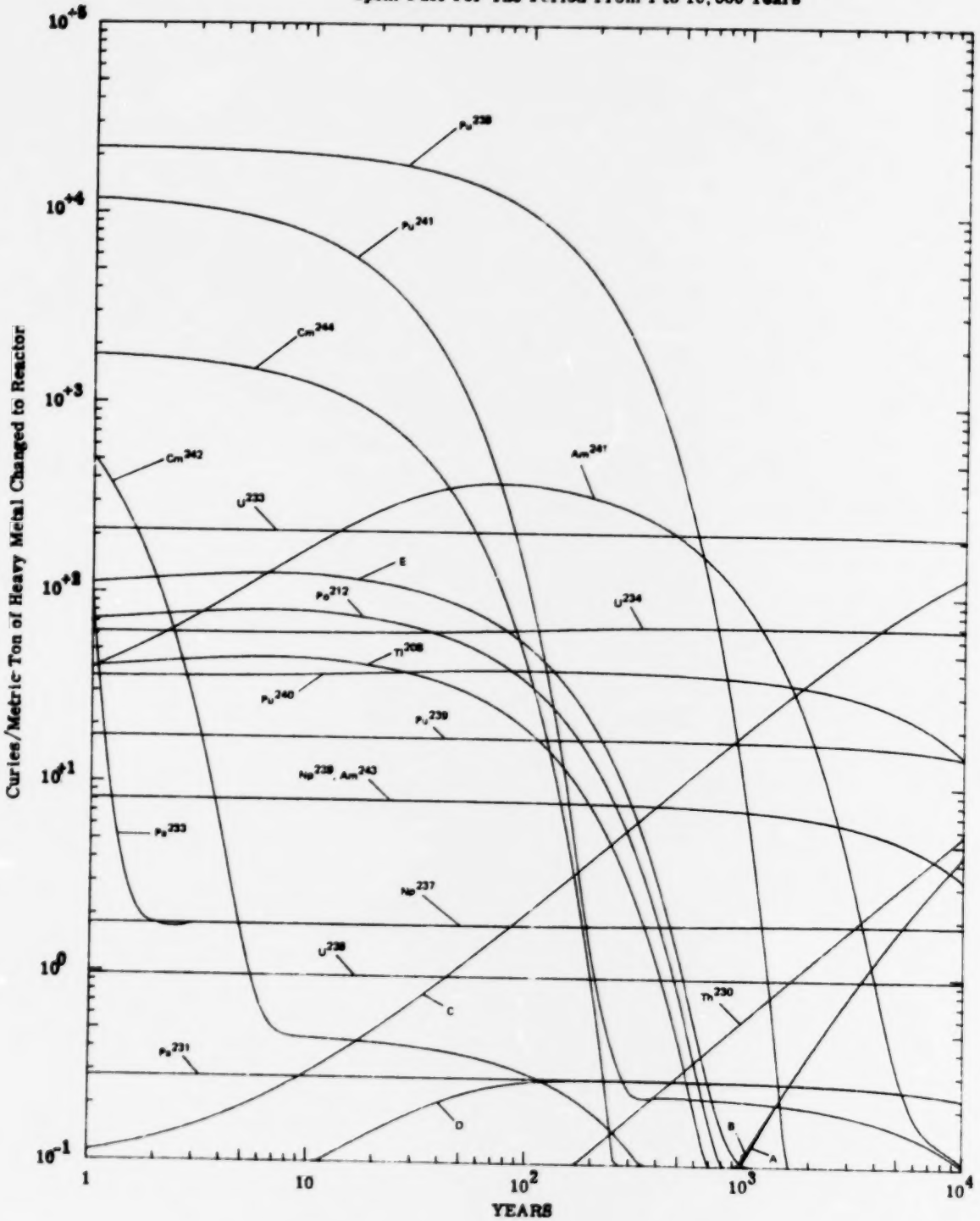


Figure B-5. Significant Actinide Activity In HTGR Equilibrium Core Spent Fuel For The Period From 1 to 10^5 Years

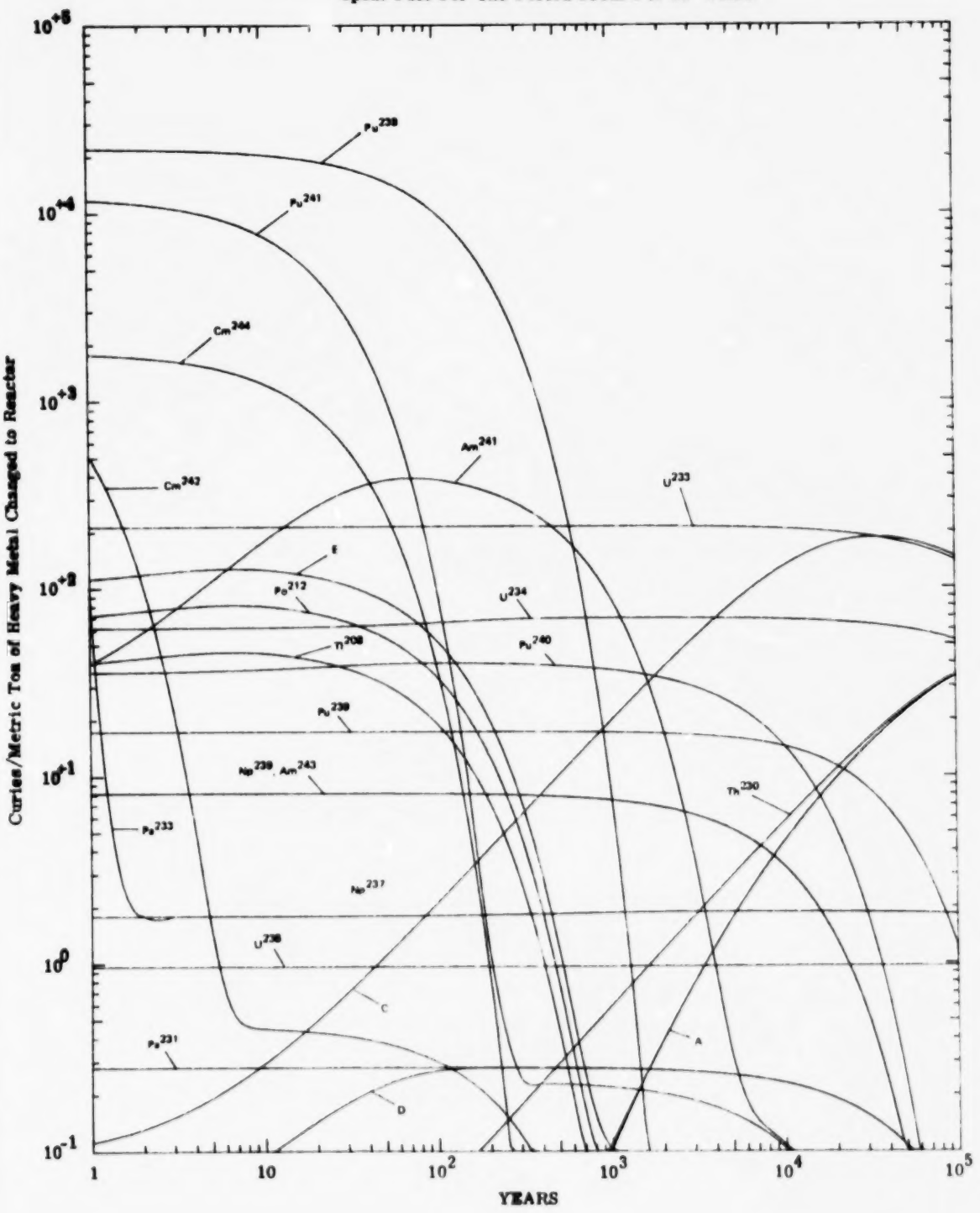
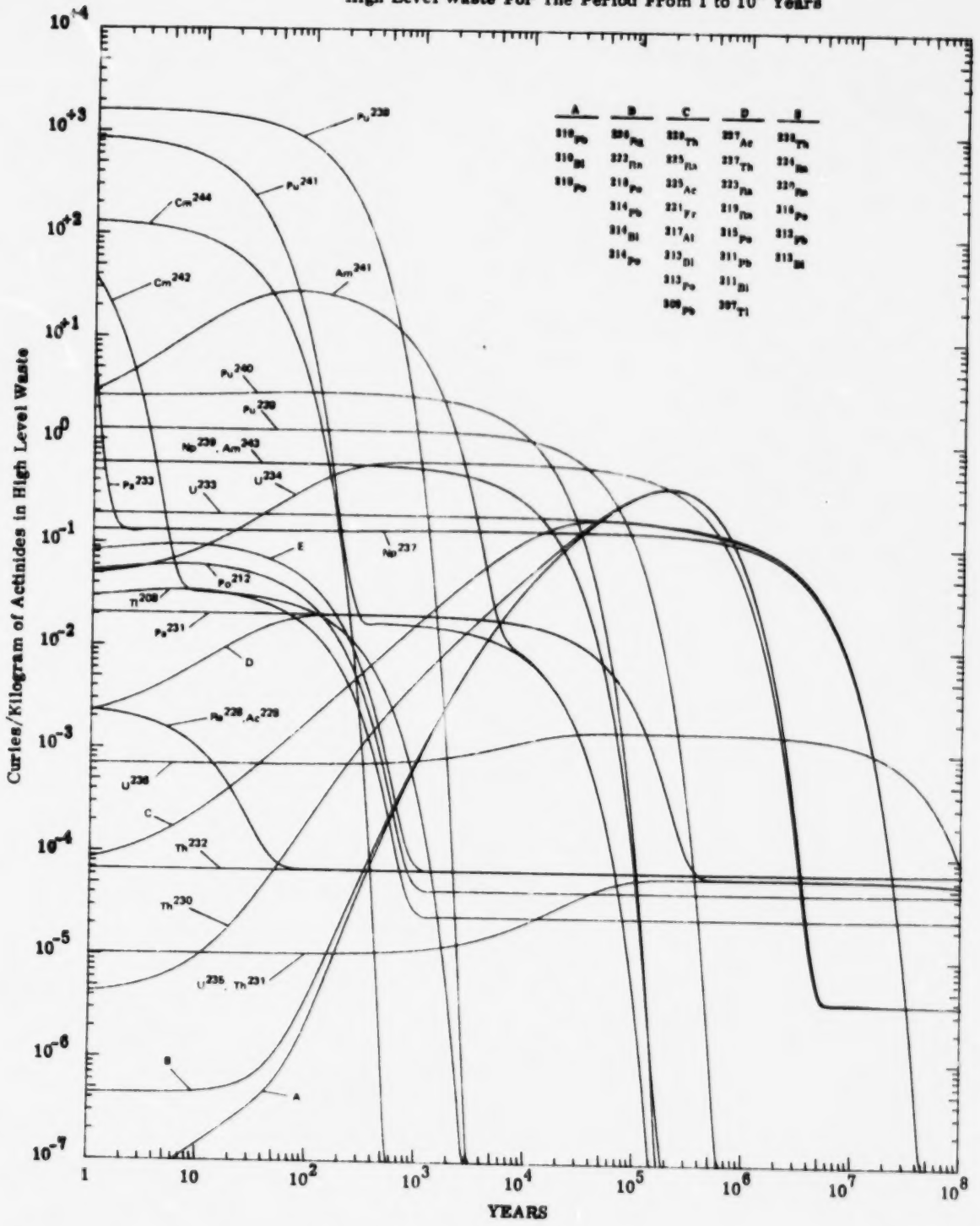


Figure B-6. Significant Actinide Activity In HTGR Equilibrium Core High Level Waste For The Period From 1 to 10^8 Years



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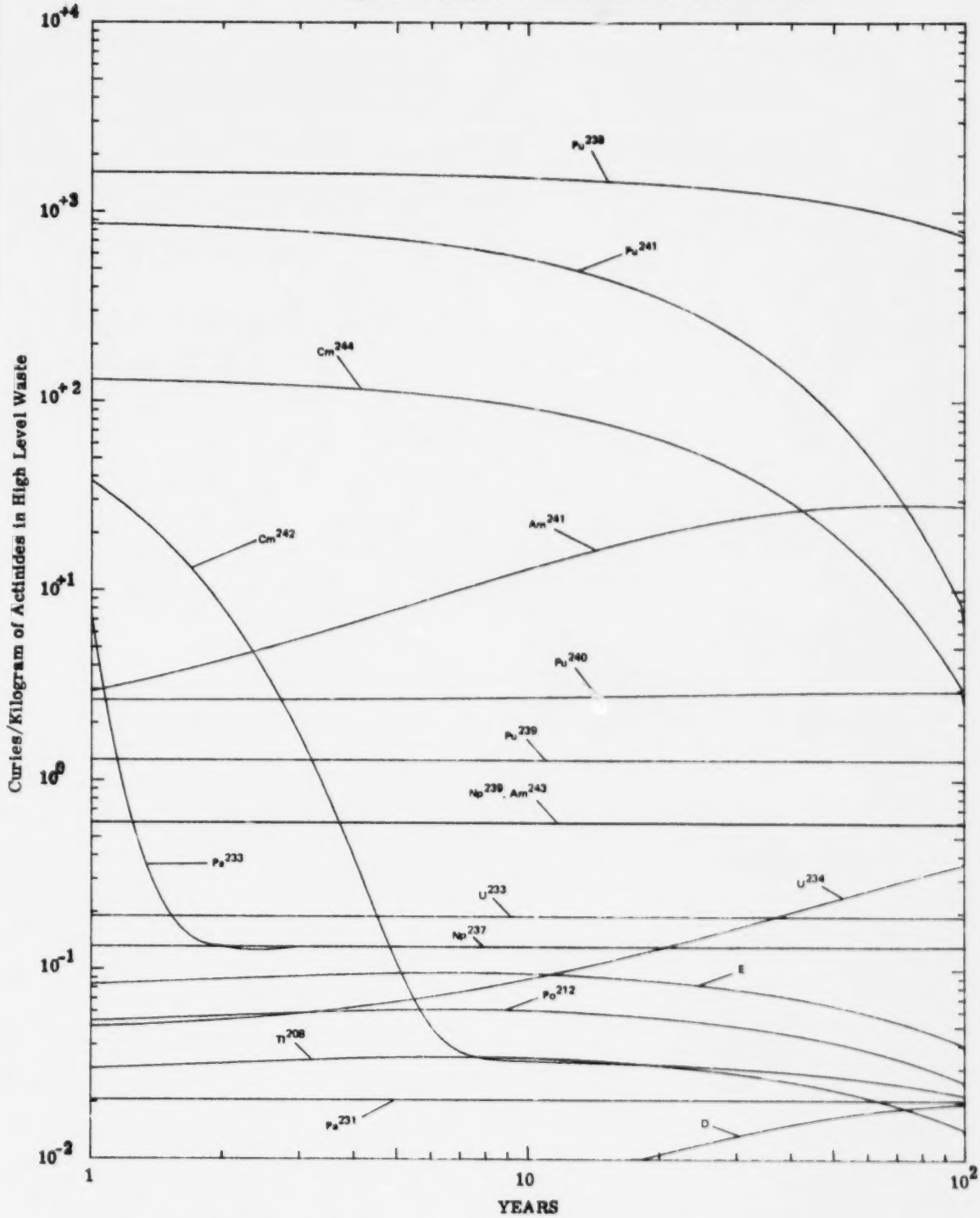

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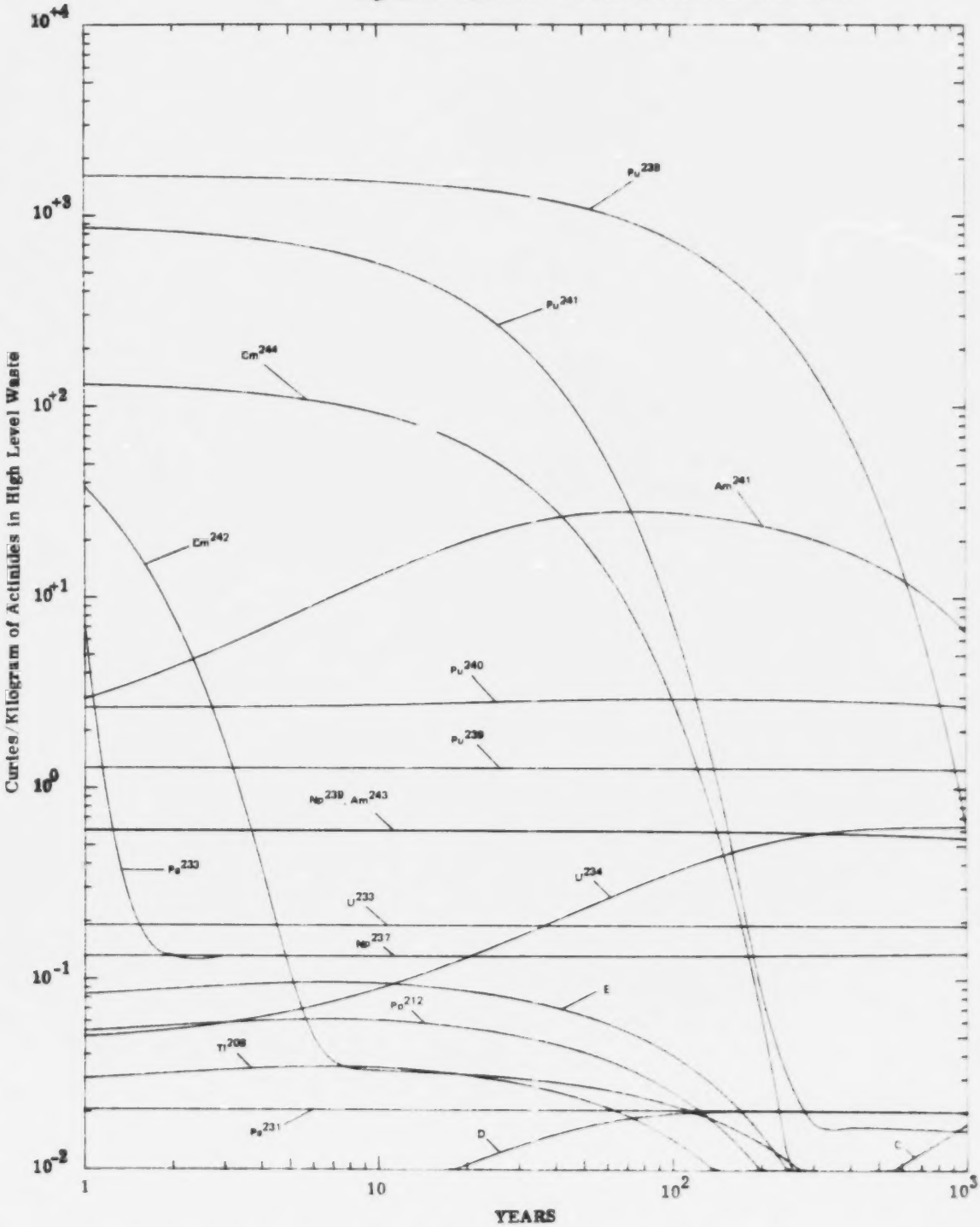

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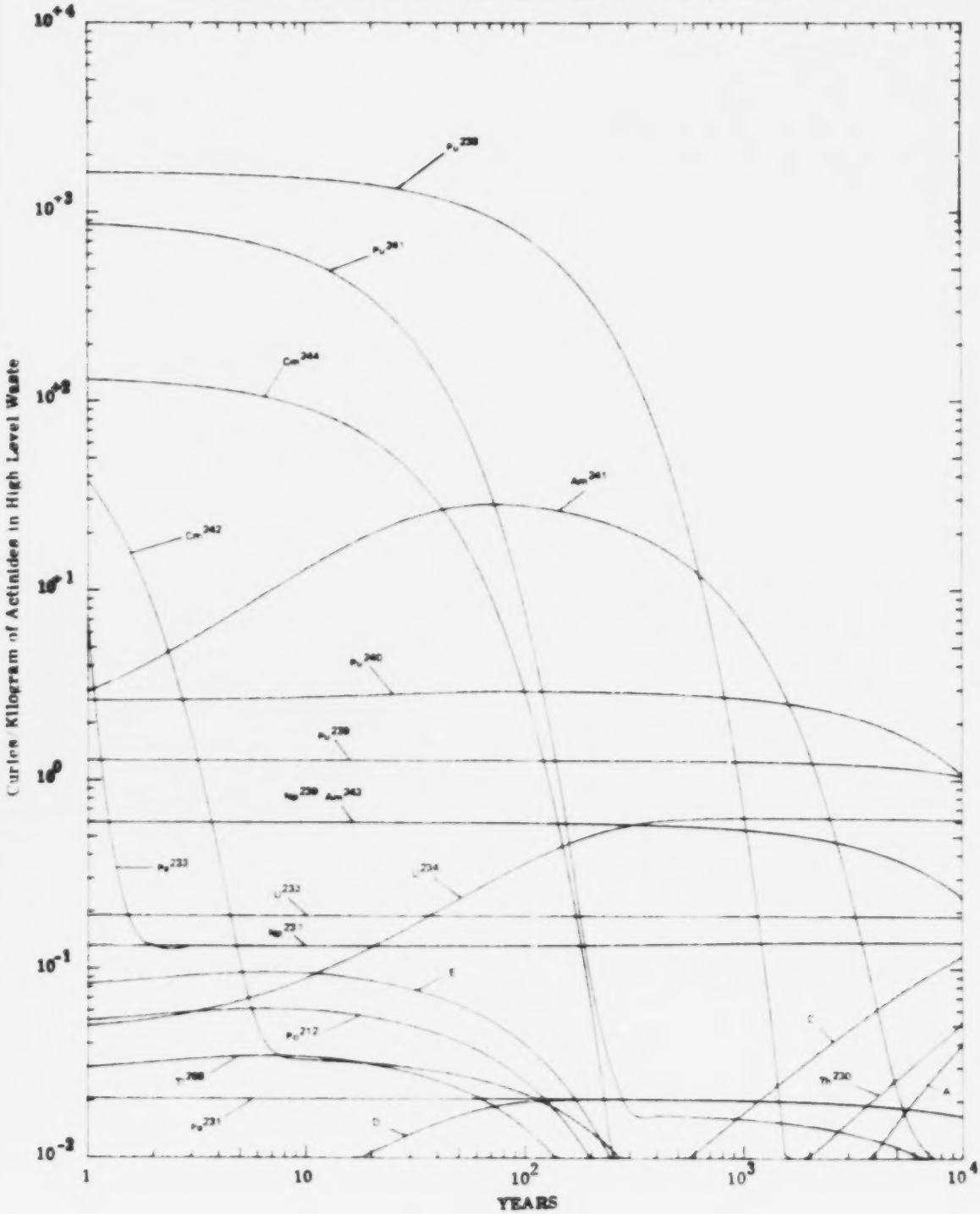

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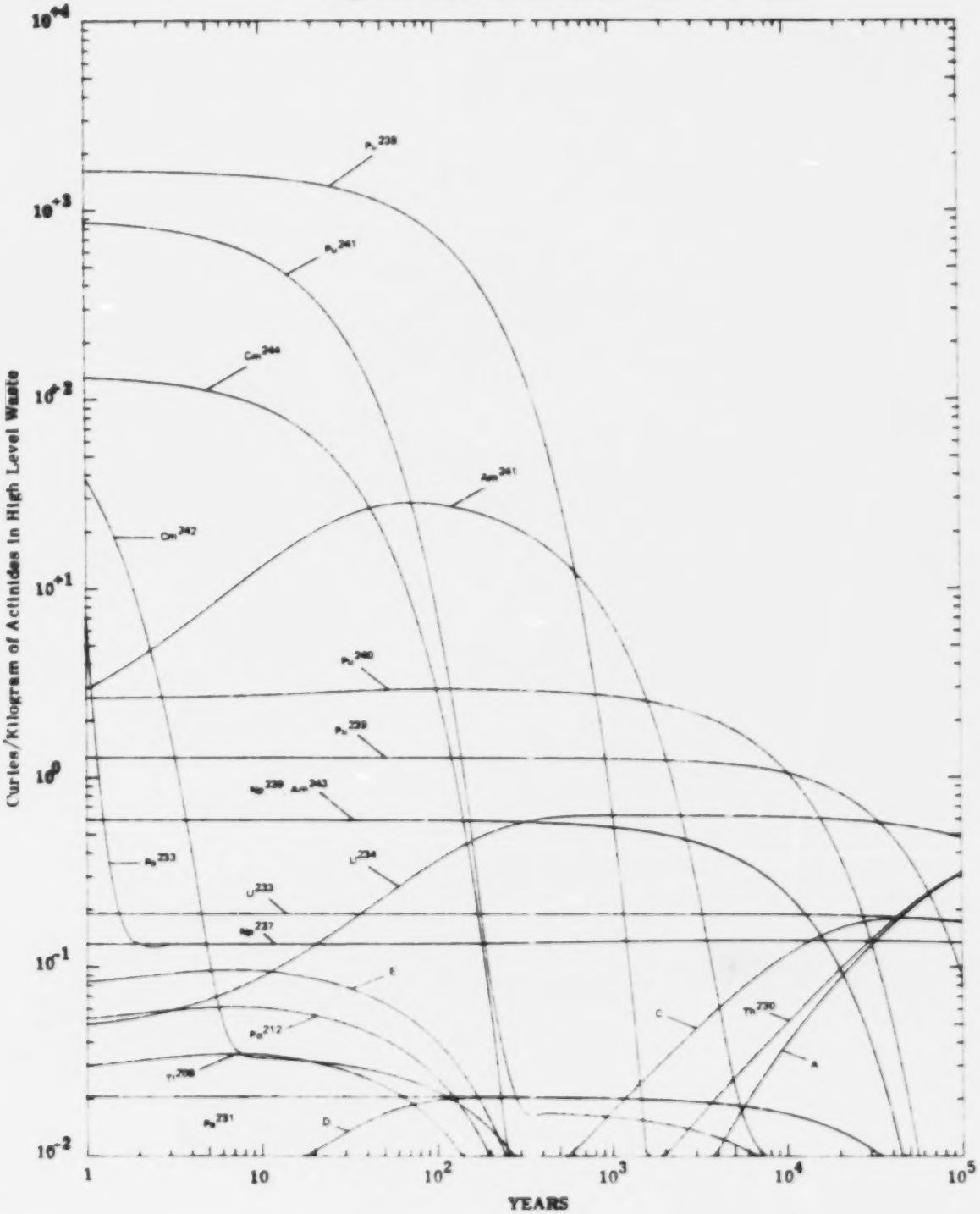
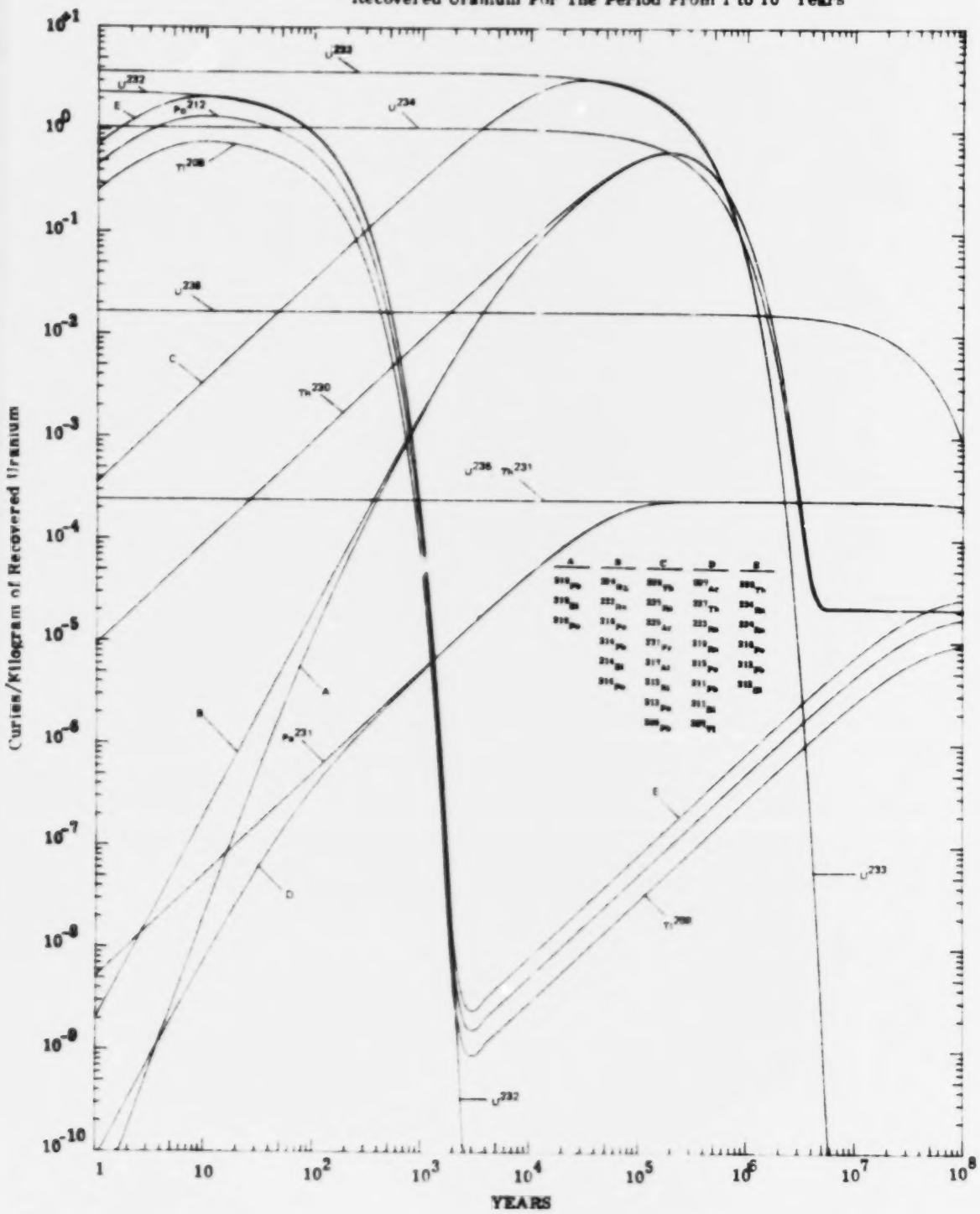


Figure B-11. Significant Actinide Activity In HTGR Equilibrium Core Recovered Uranium For The Period From 1 to 10^8 Years



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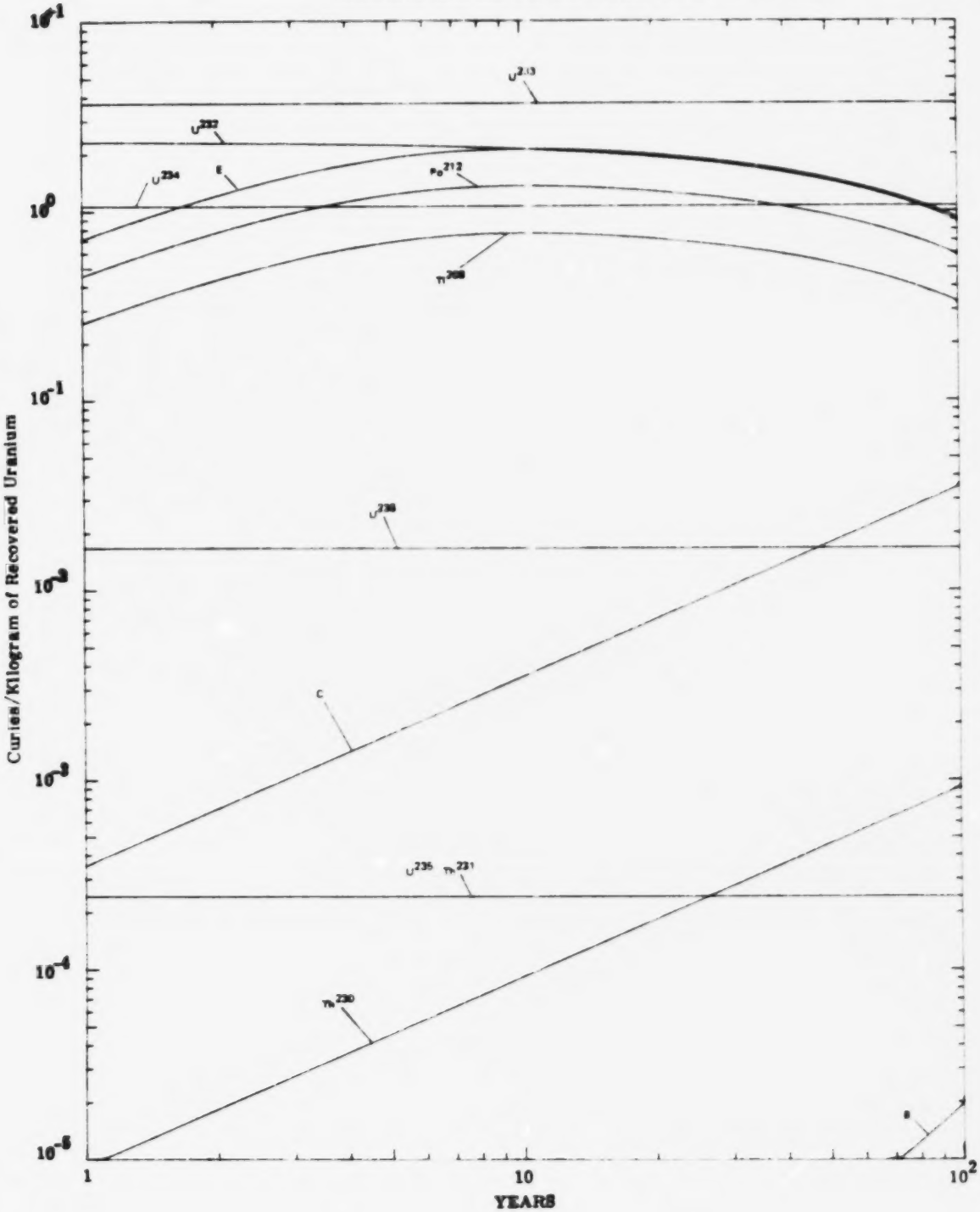

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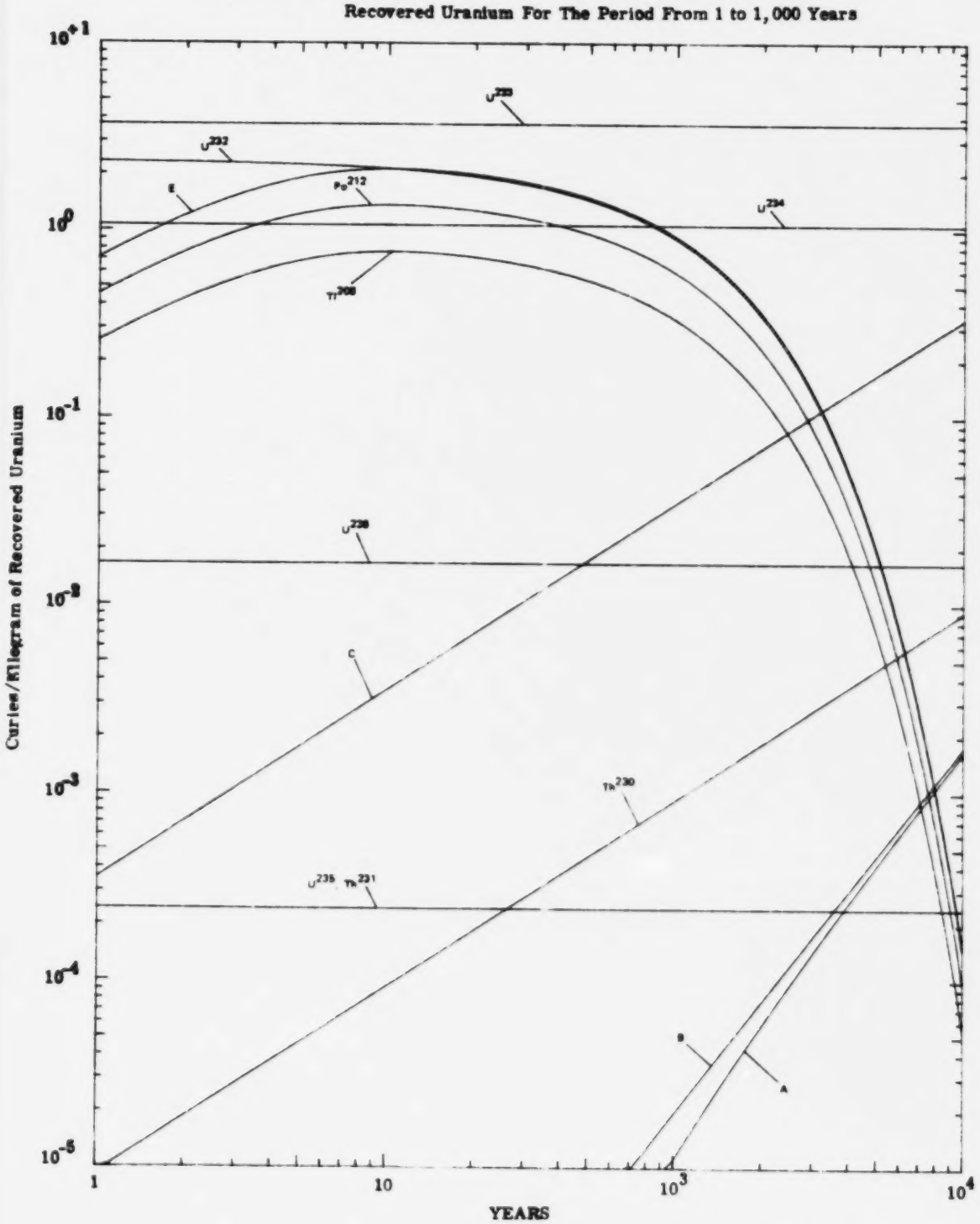

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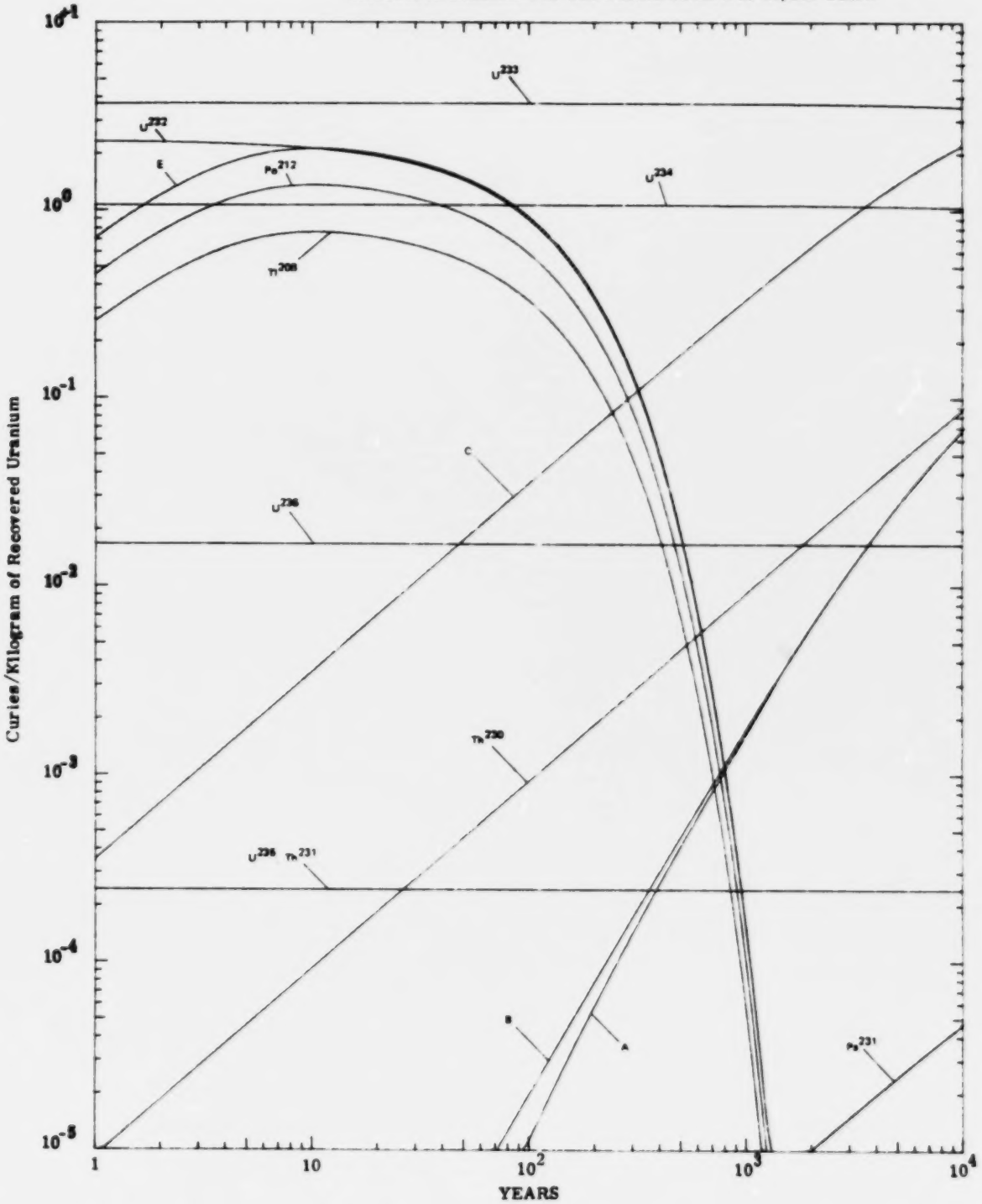

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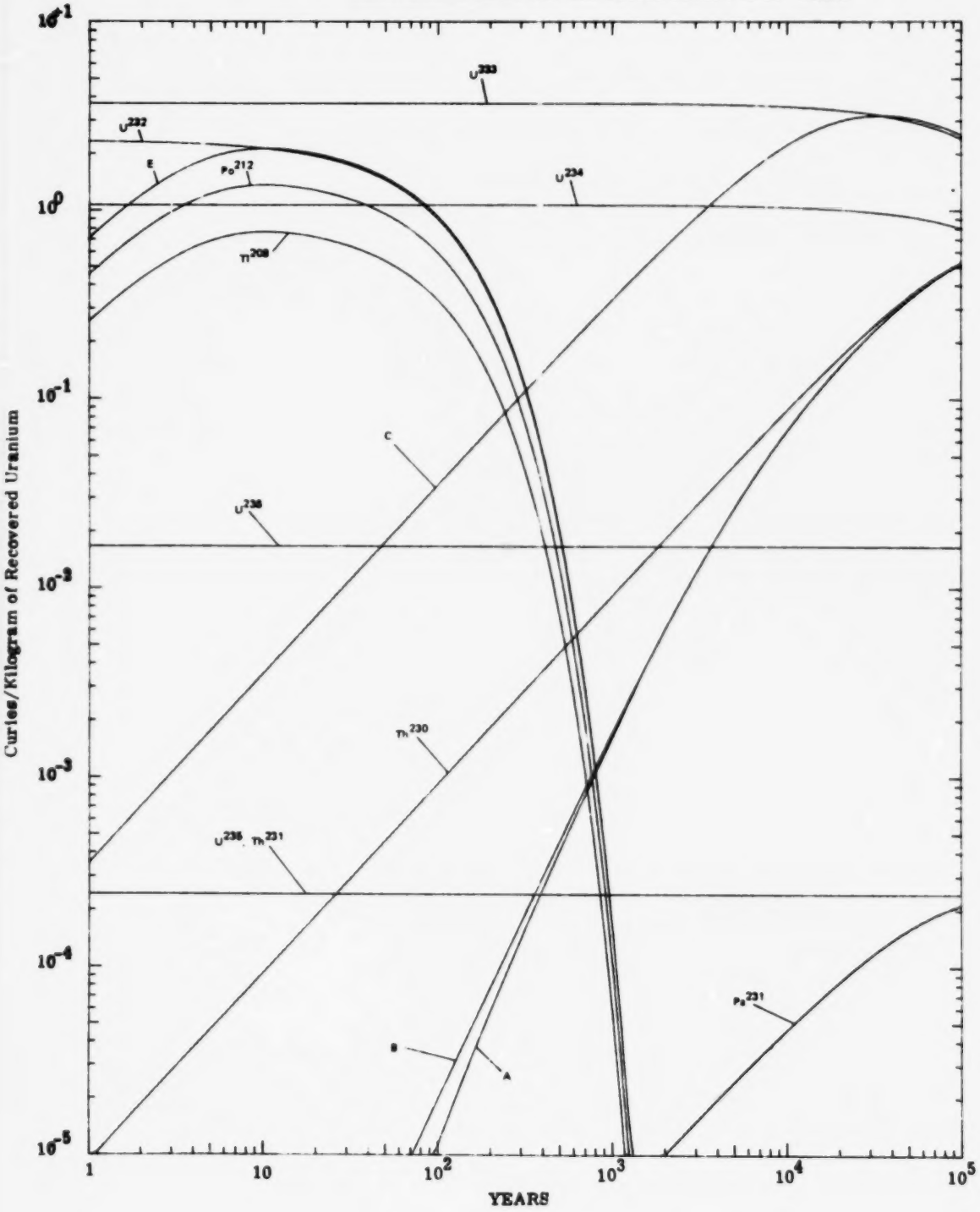

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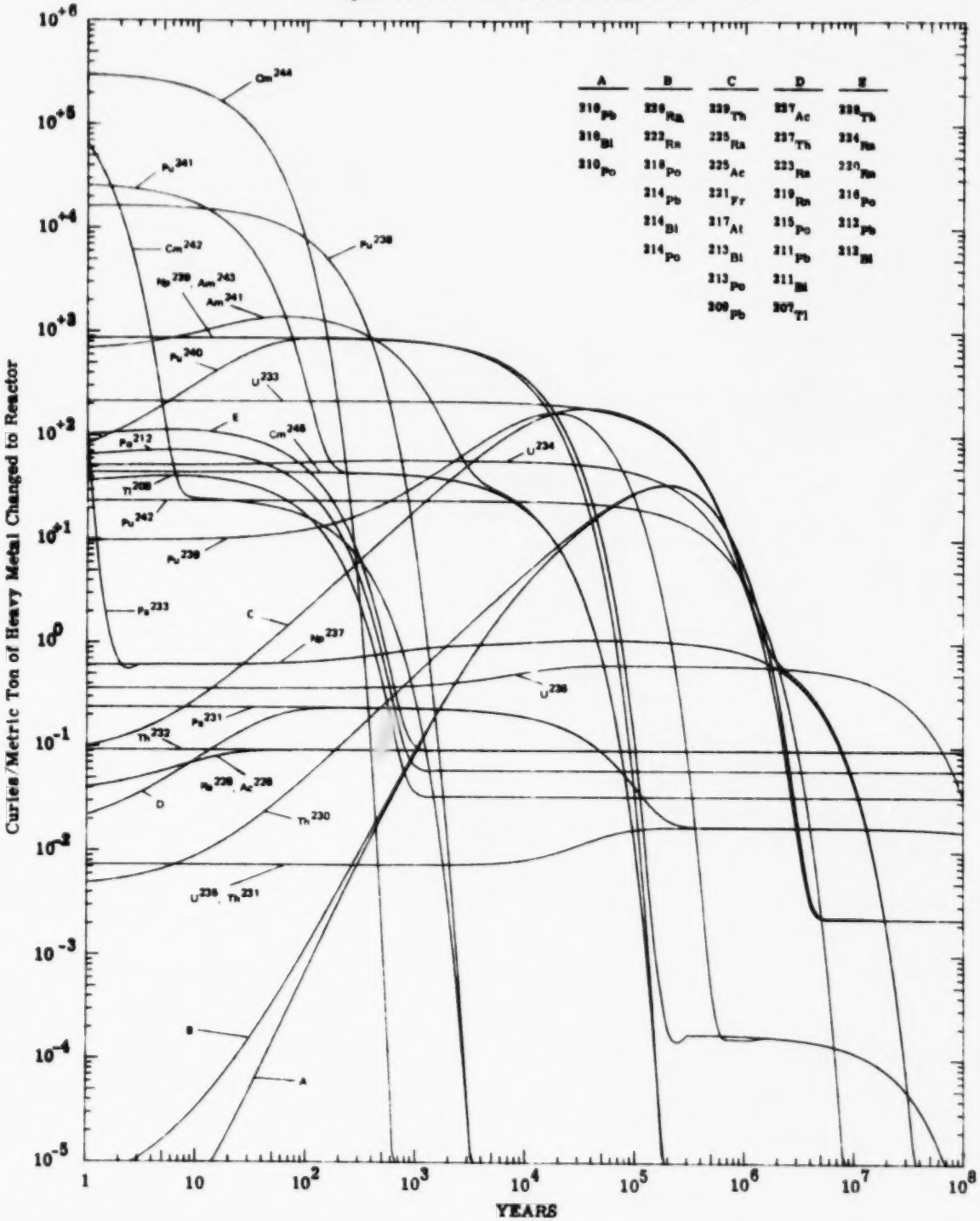

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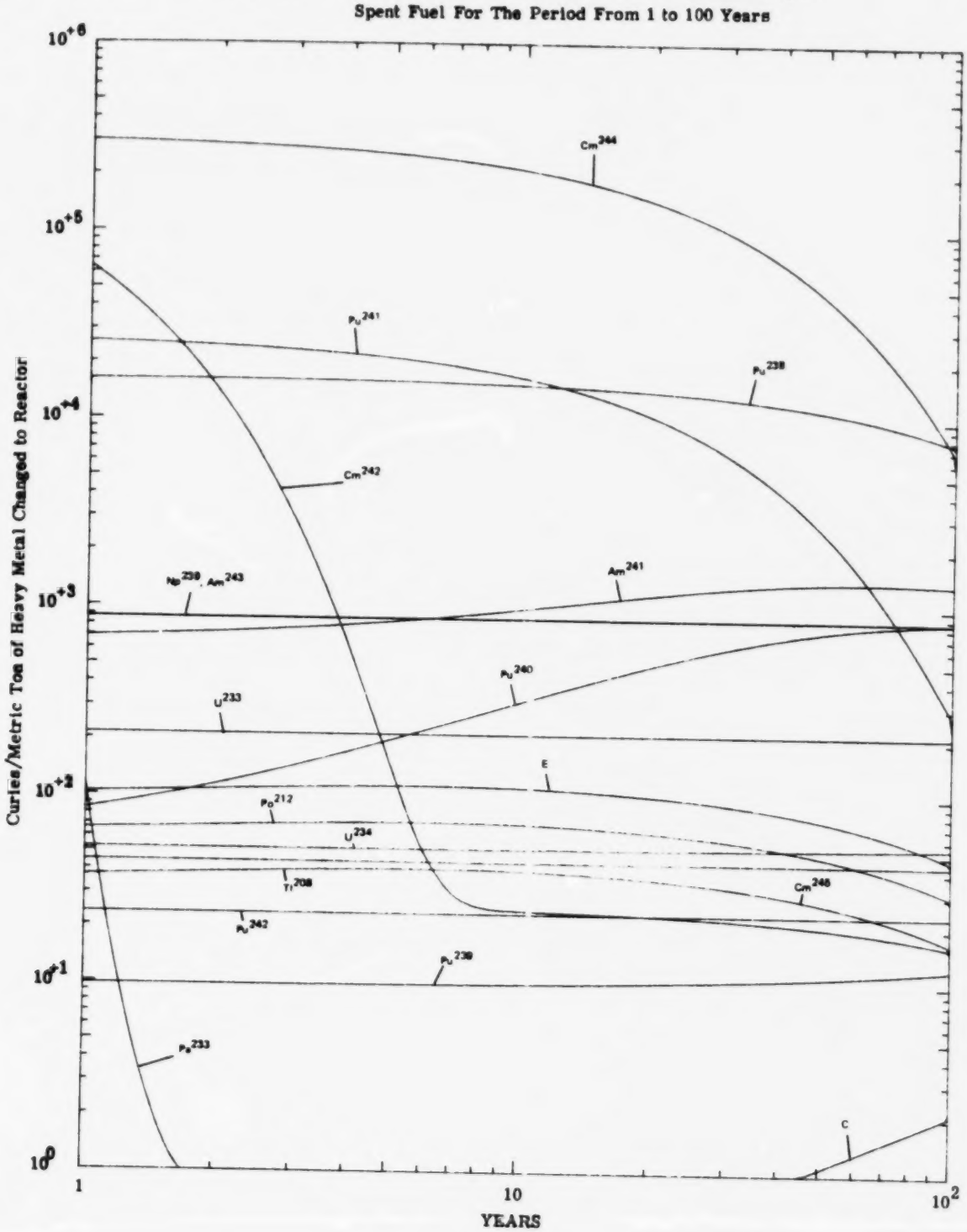

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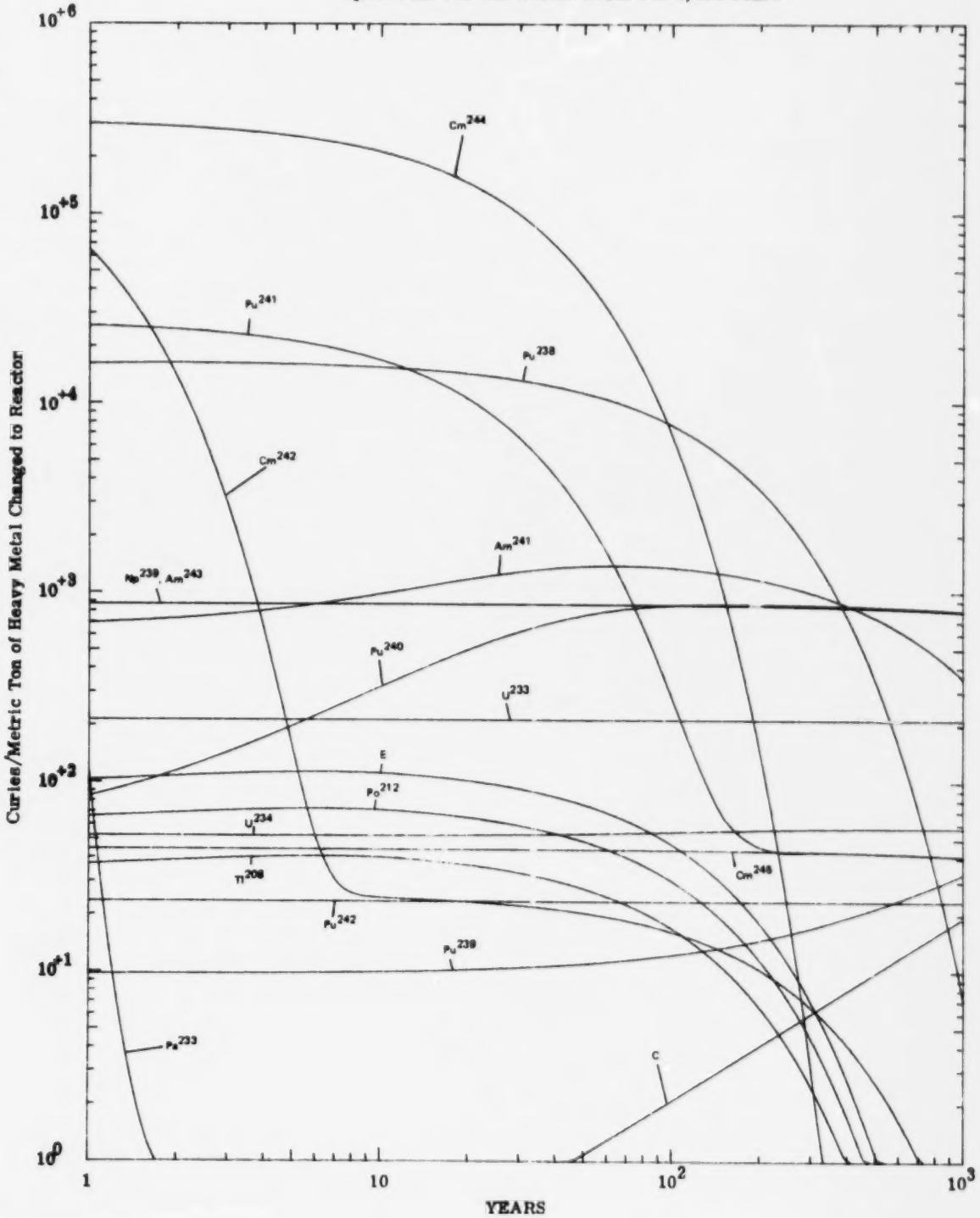

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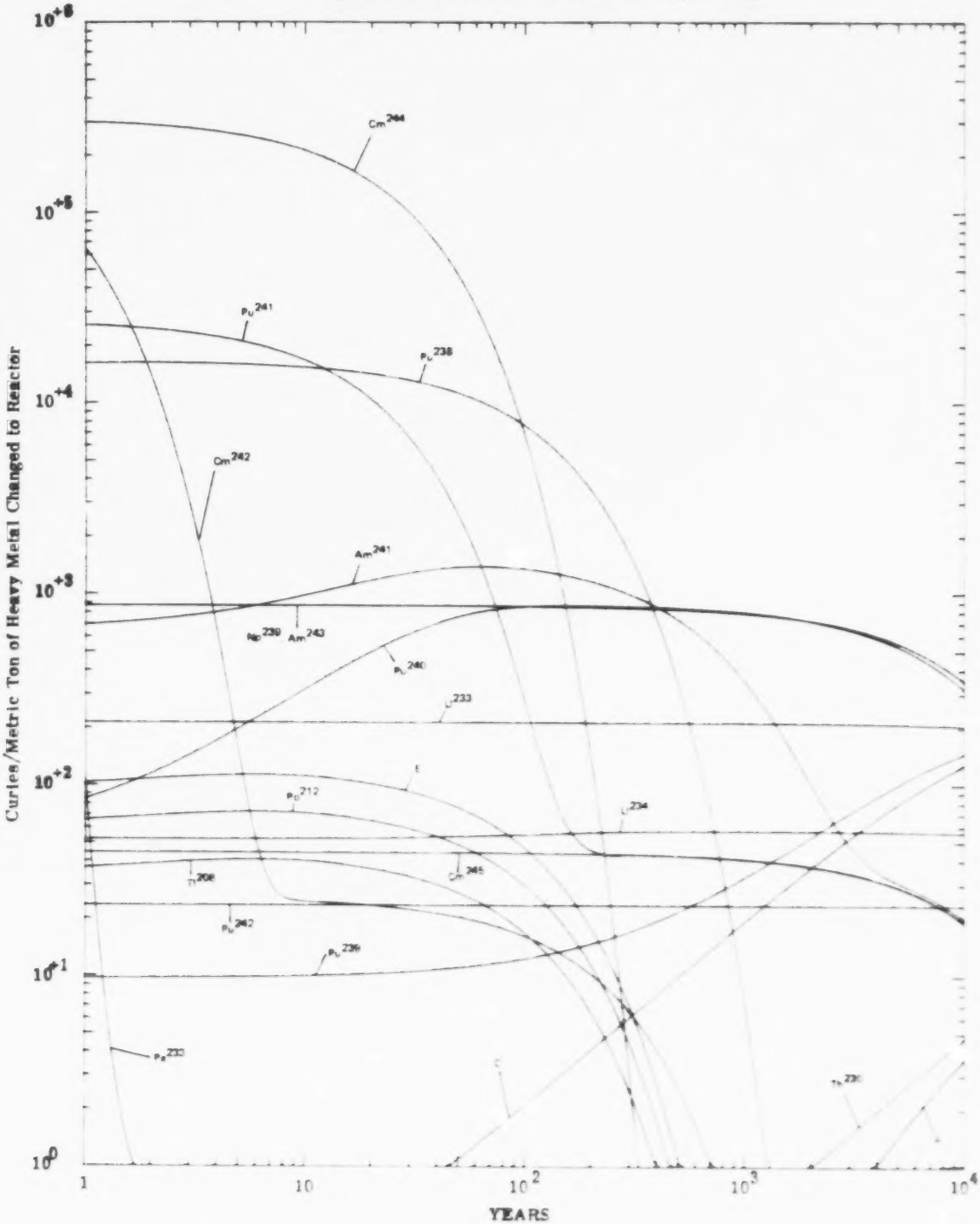


Figure C-5. Significant Actinide Activity In HTGR Plutonium Cycle Spent Fuel For The Period From 1 to 10^5 Years

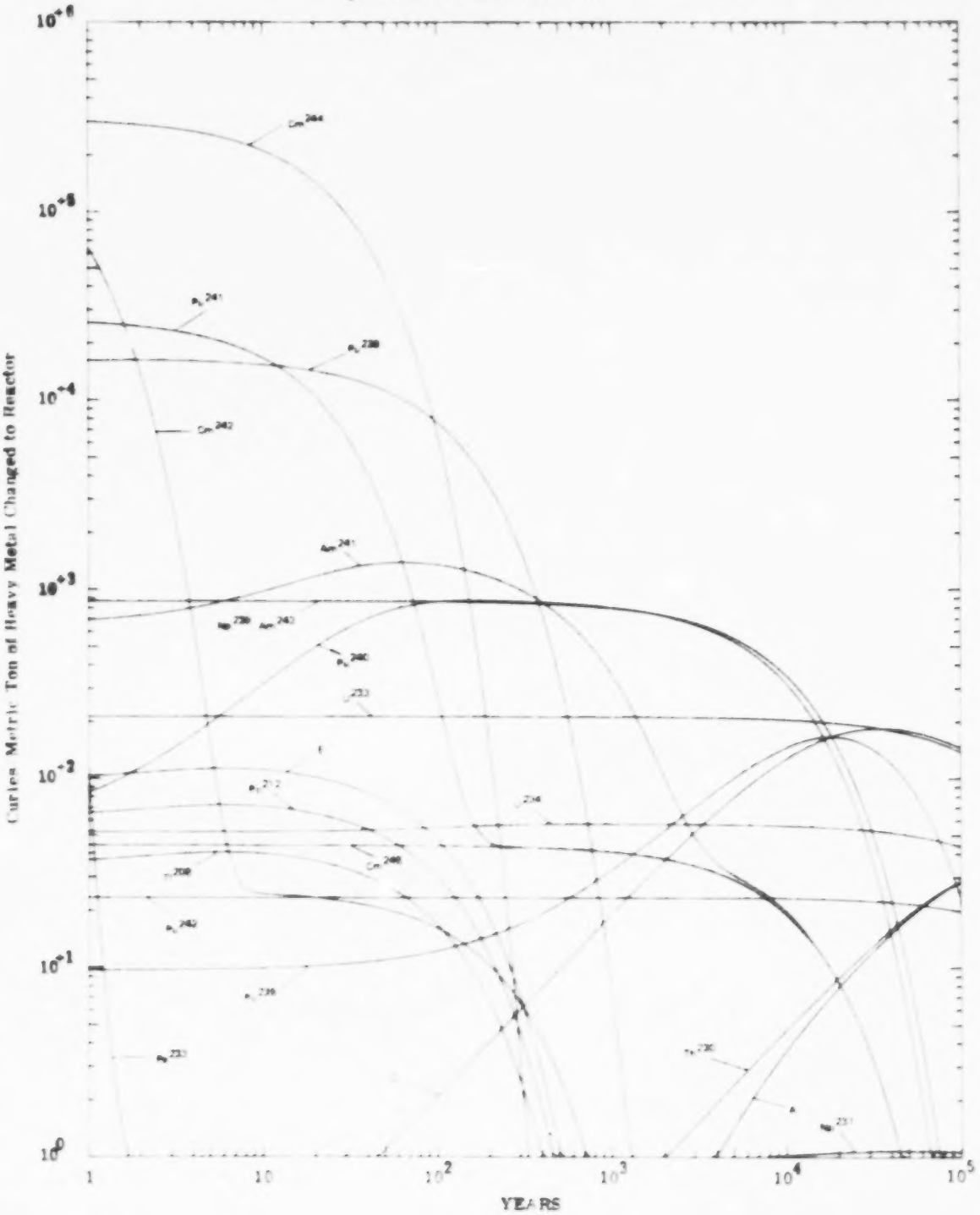


Figure C-6. Significant Actinide Activity In HTGR Plutonium Cycle High Level Waste For The Period From 1 to 10^8 Years

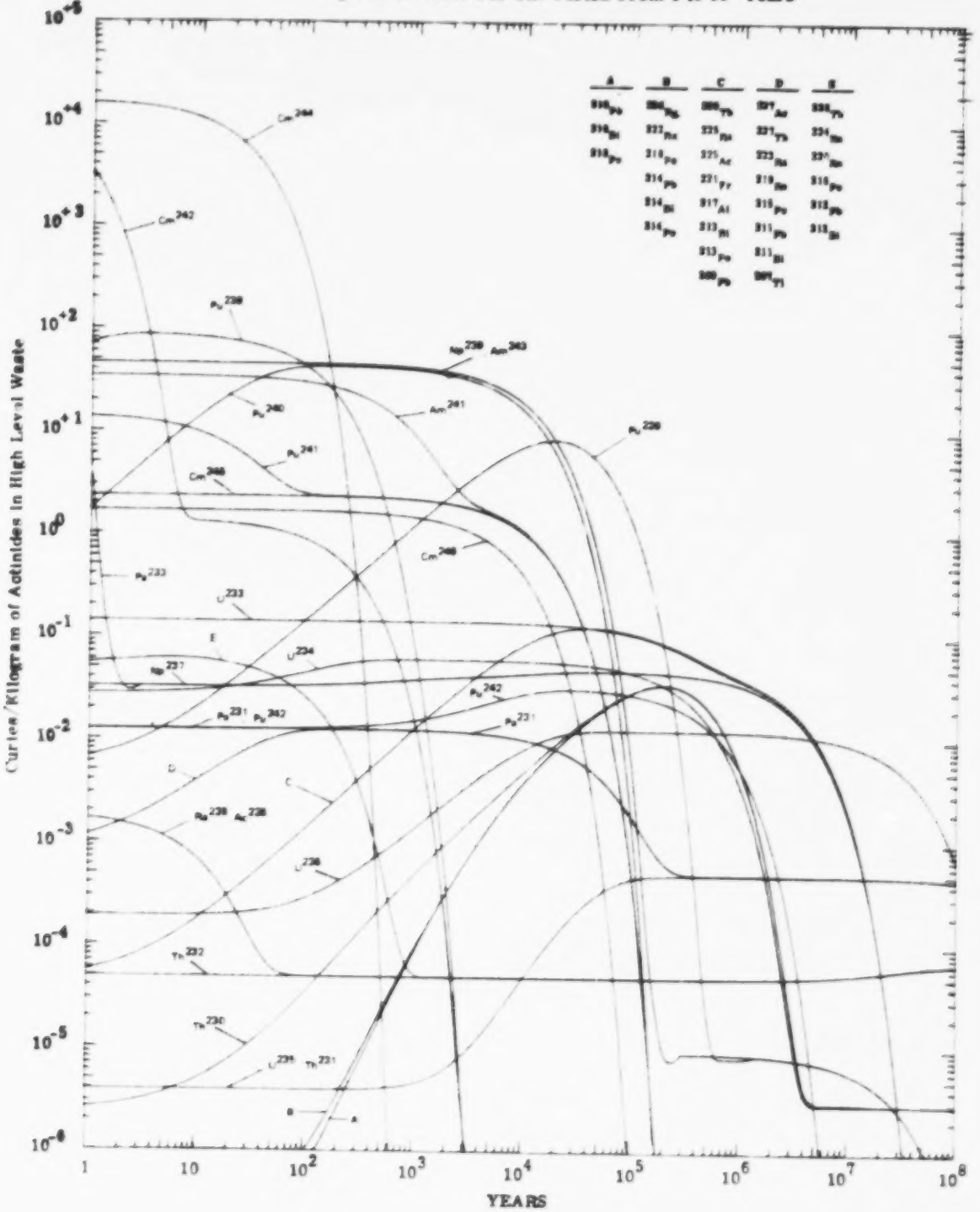
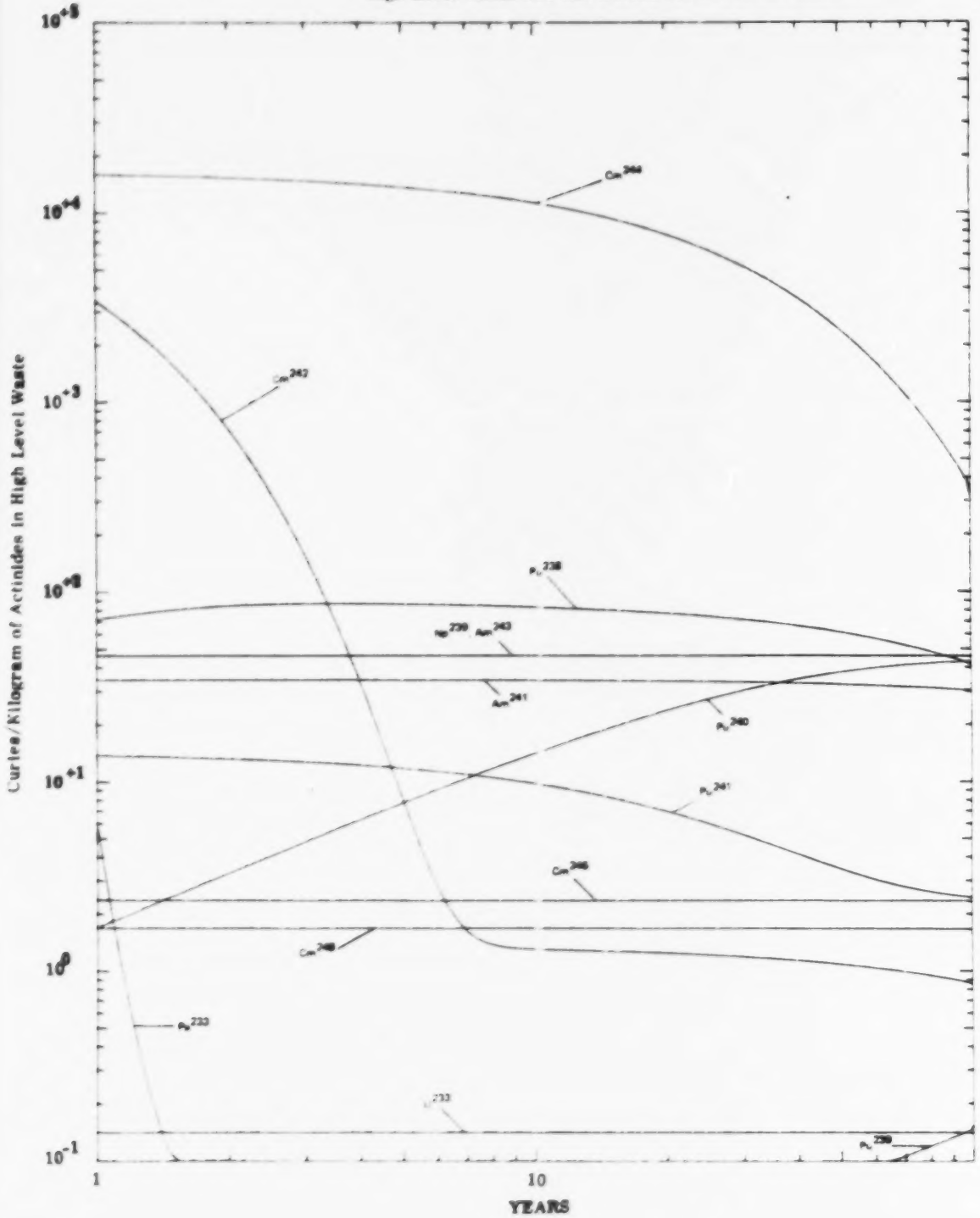


Figure C-7. Significant Actinide Activity In HTGR Plutonium Cycle High Level Waste For The Period From 1 to 100 Years



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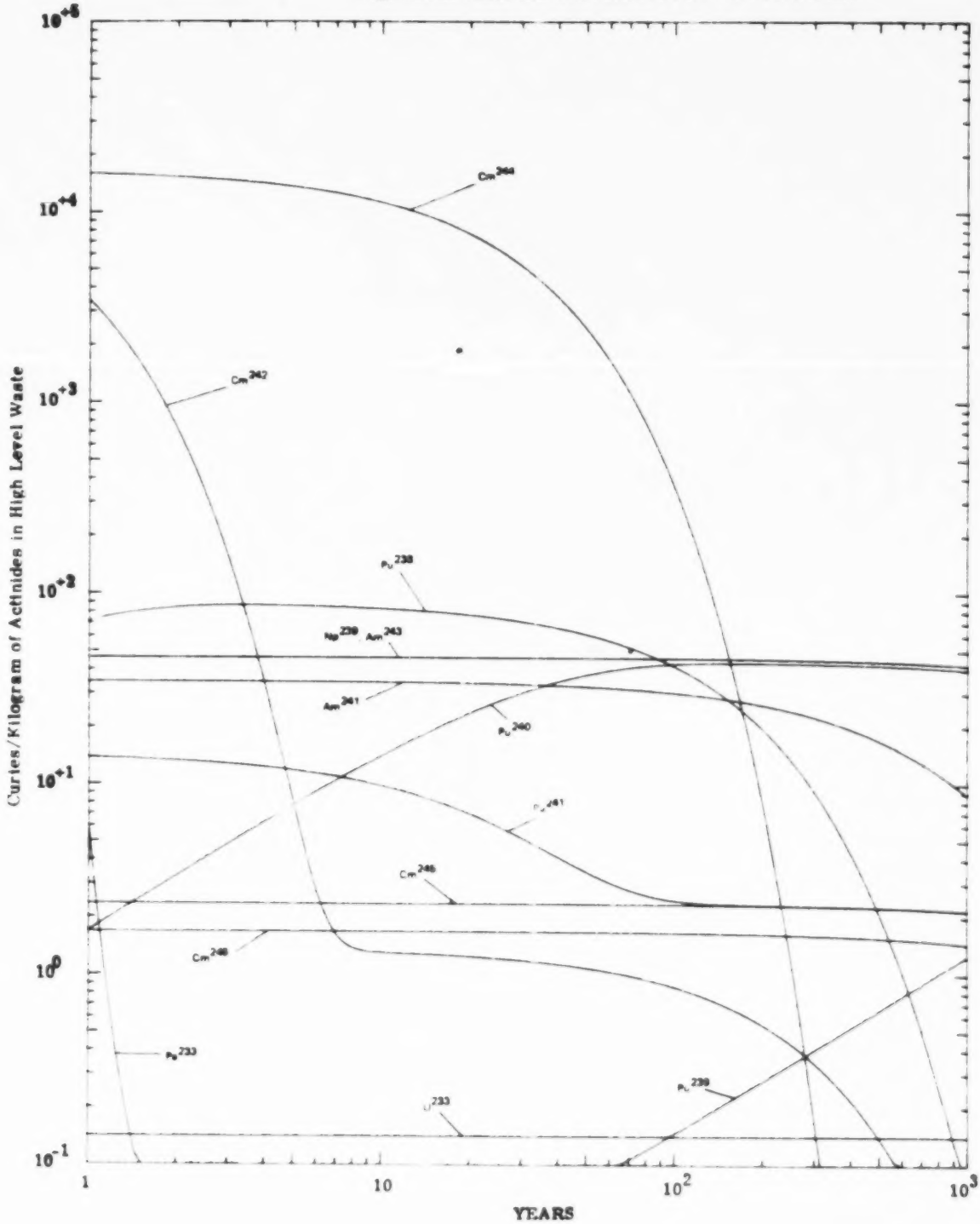

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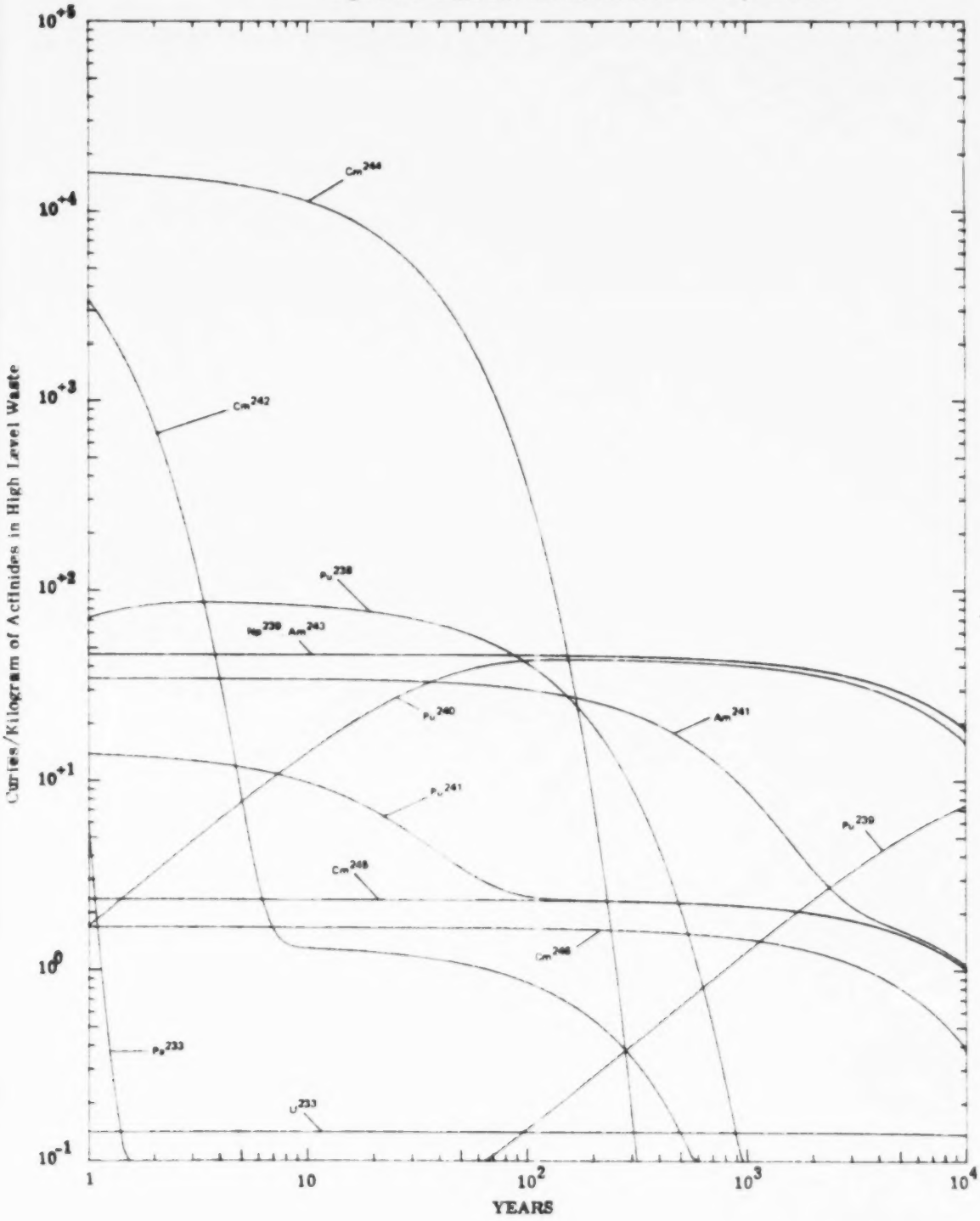


Figure C-10. Significant Actinide Activity In HTGR Plutonium Cycle High Level Waste For The Period From 1 to 10^5 Years

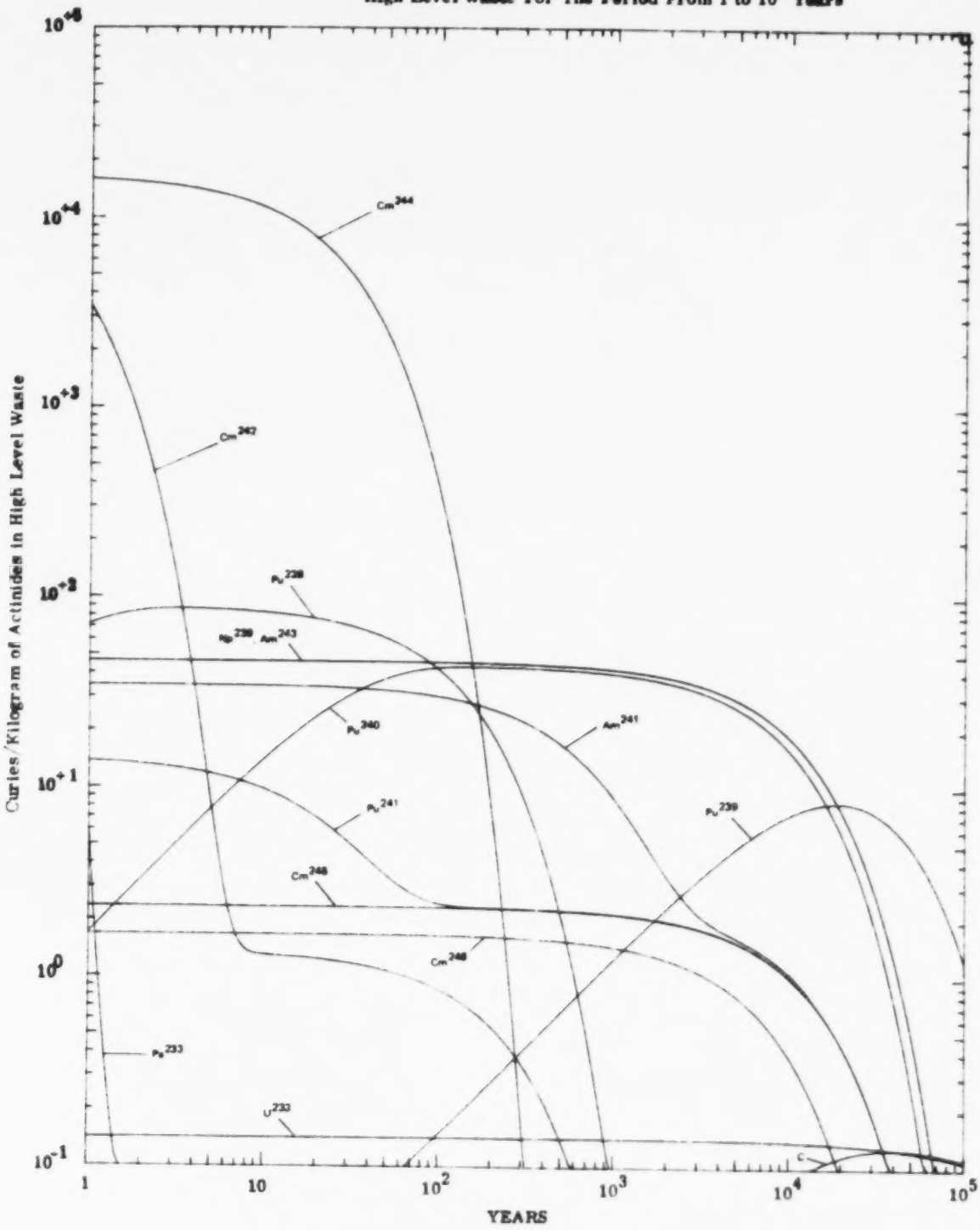


Figure C-11. Significant Actinide Activity In HTGR Plutonium Cycle Recovered Uranium For The Period From 1 to 10^8 Years

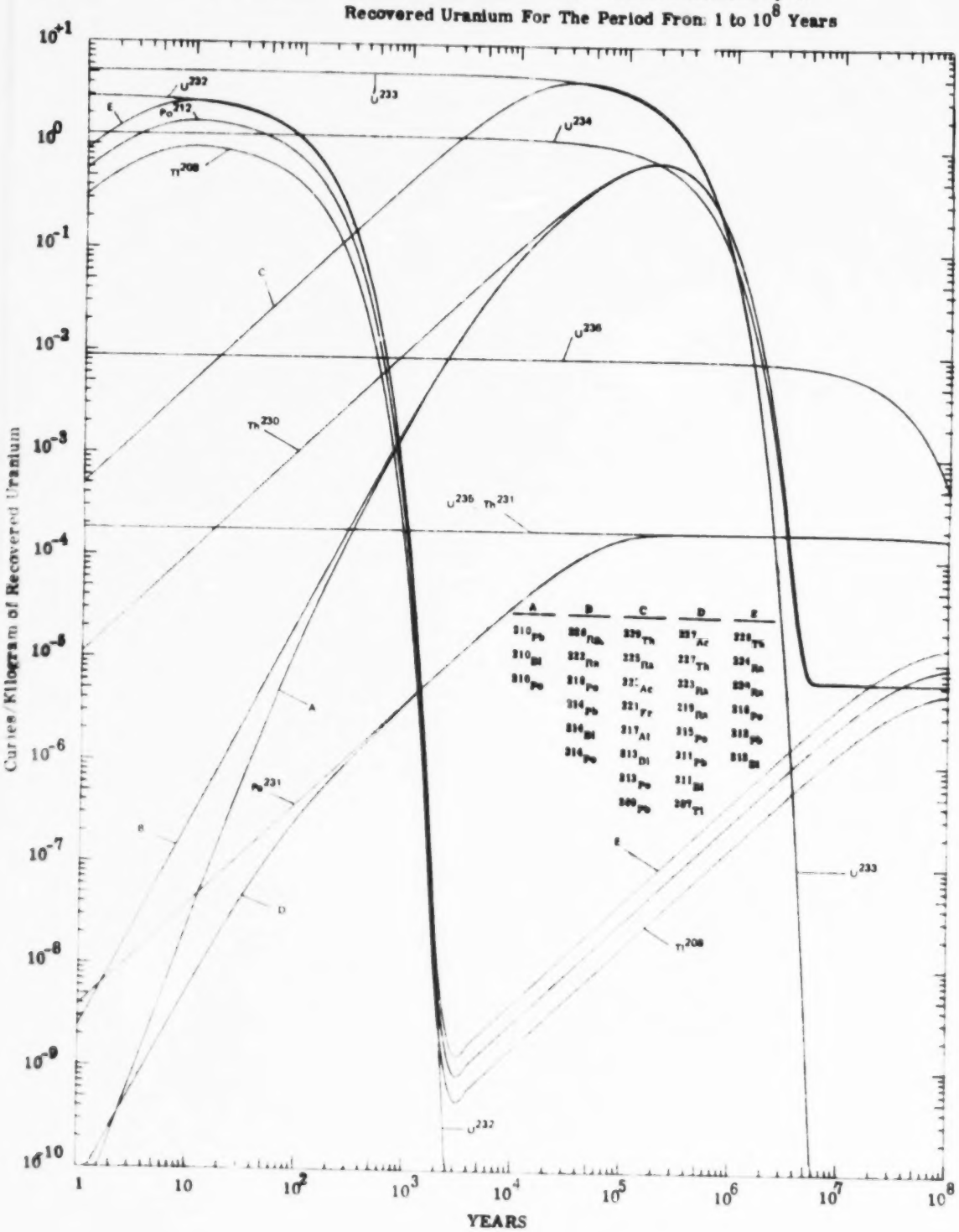


Figure C-12. Significant Actinide Activity In HTGR Plutonium Cycle Recovered Uranium For The Period From 1 to 100 Years

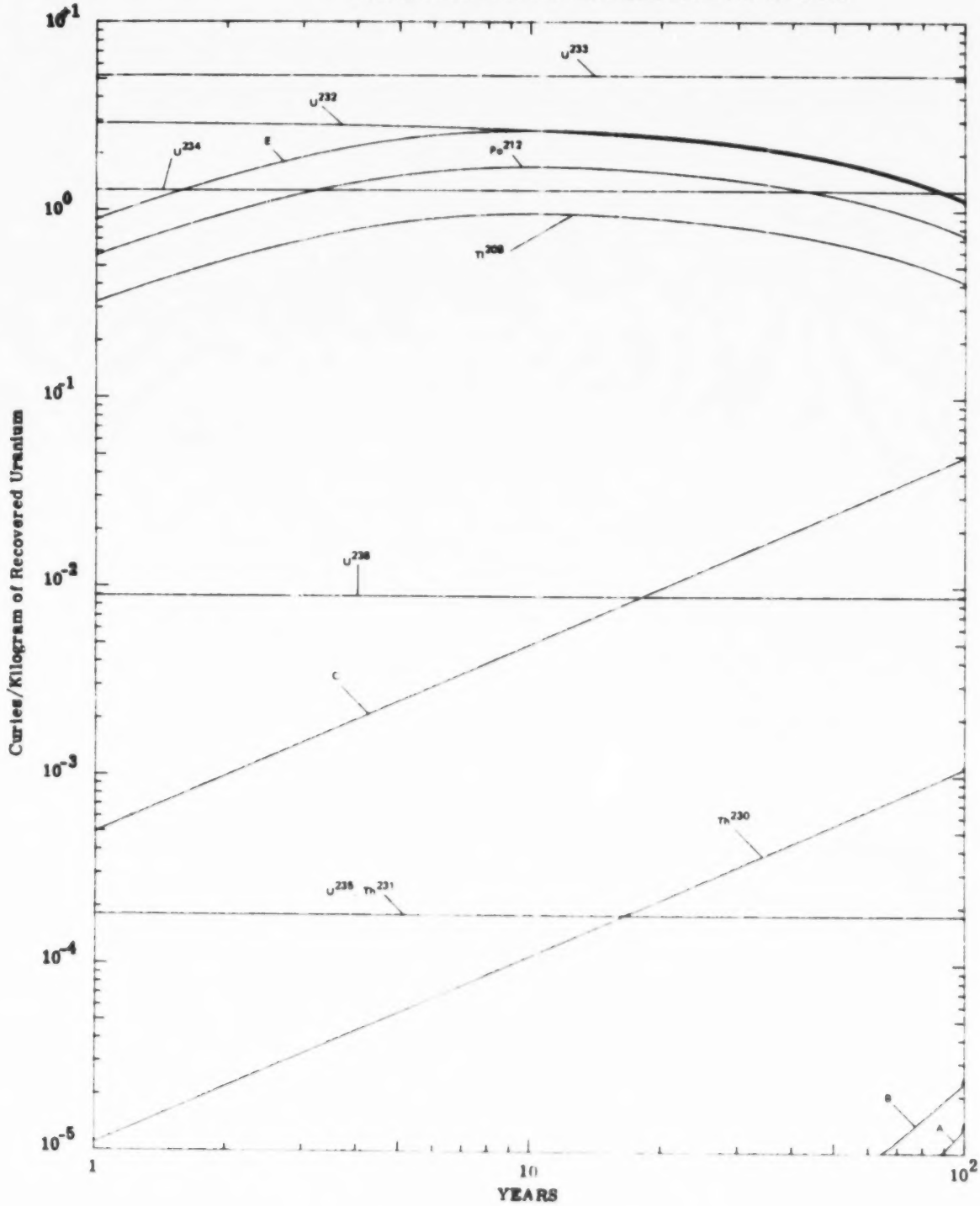


Figure C-13. Significant Actinide Activity In HTGR Plutonium Cycle Recovered Uranium For The Period From 1 to 1,000 Years

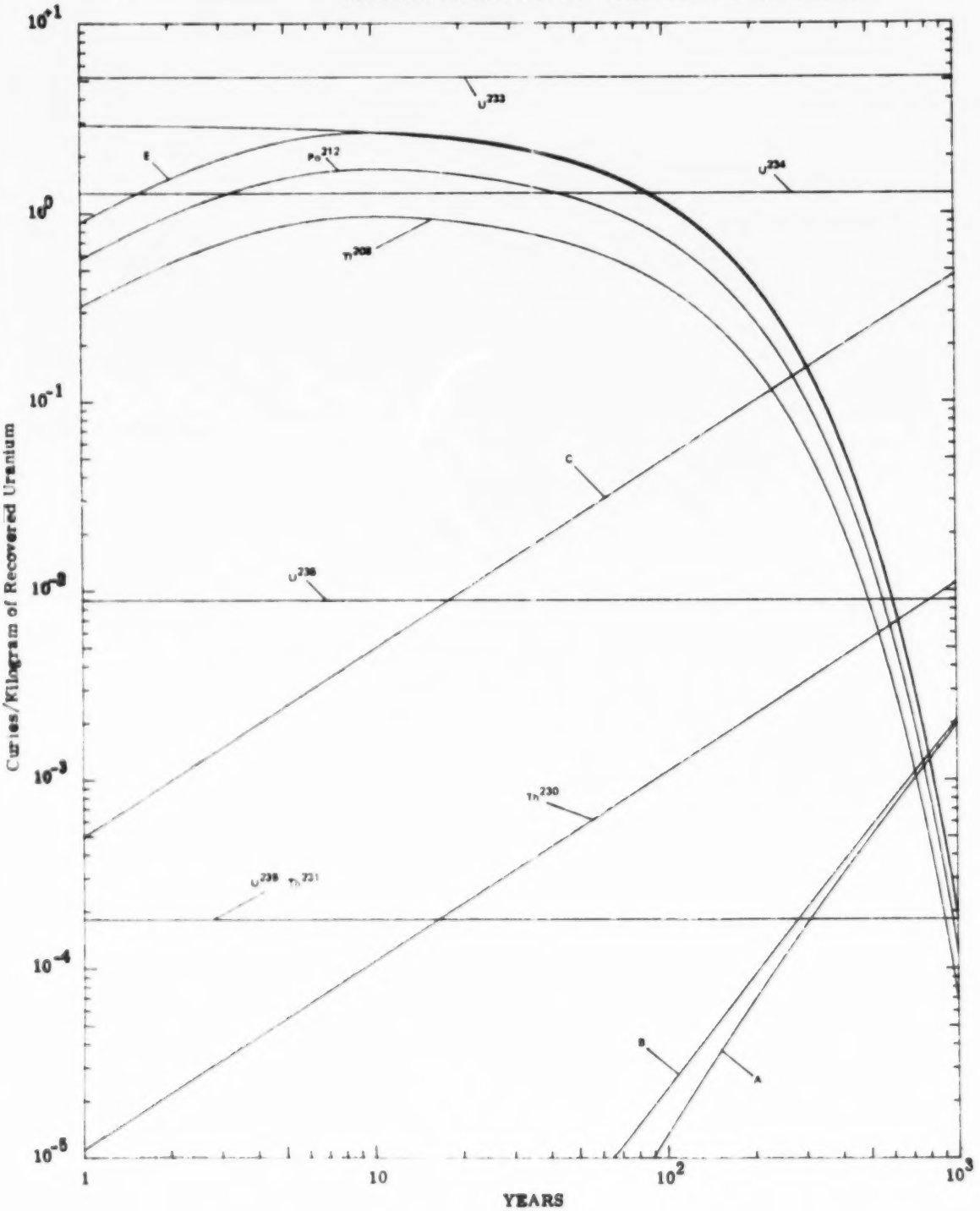


Figure C-14. Significant Actinide Activity In HTGR Plutonium Cycle Recovered Uranium For The Period From 1 to 10,000 Years

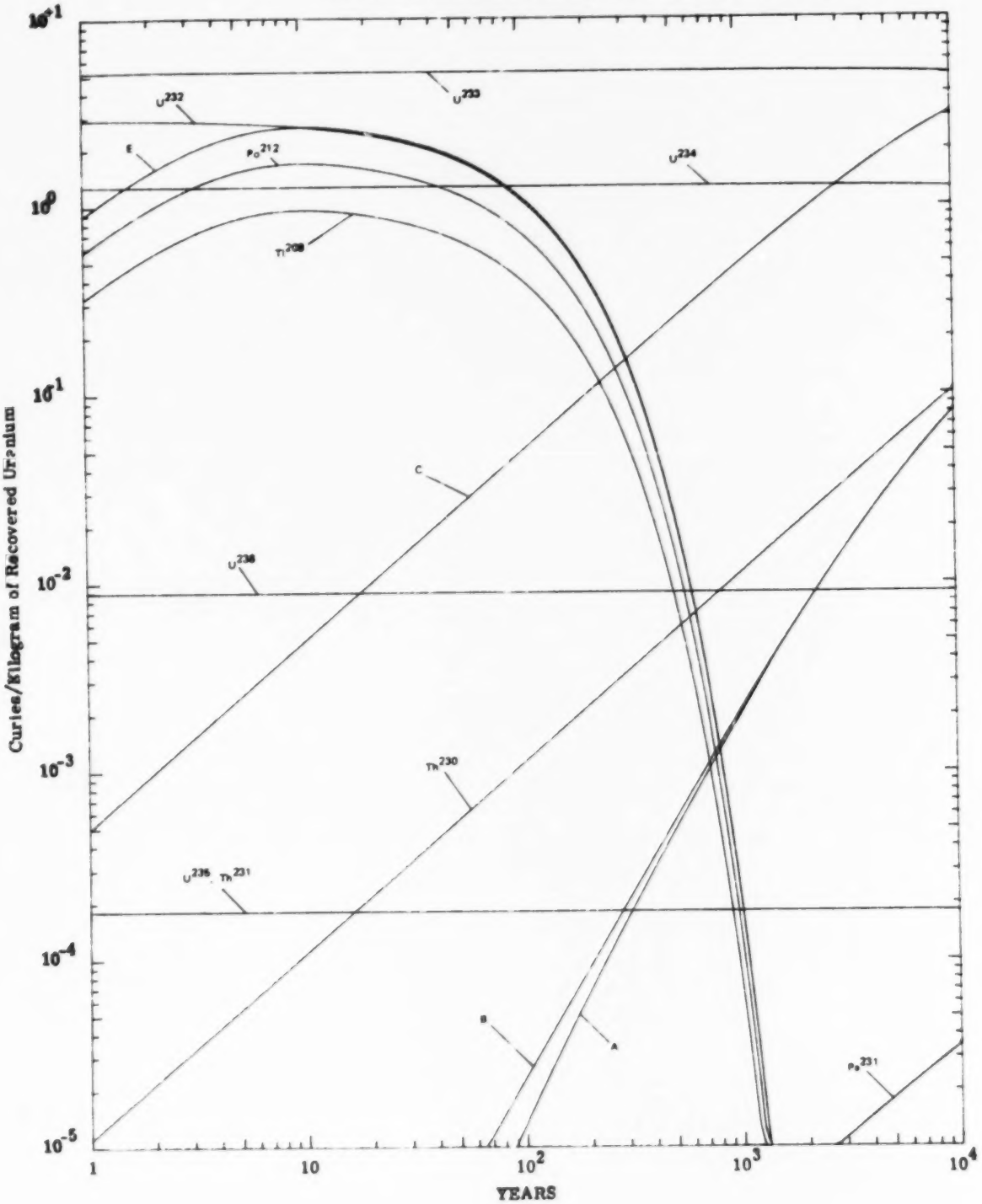
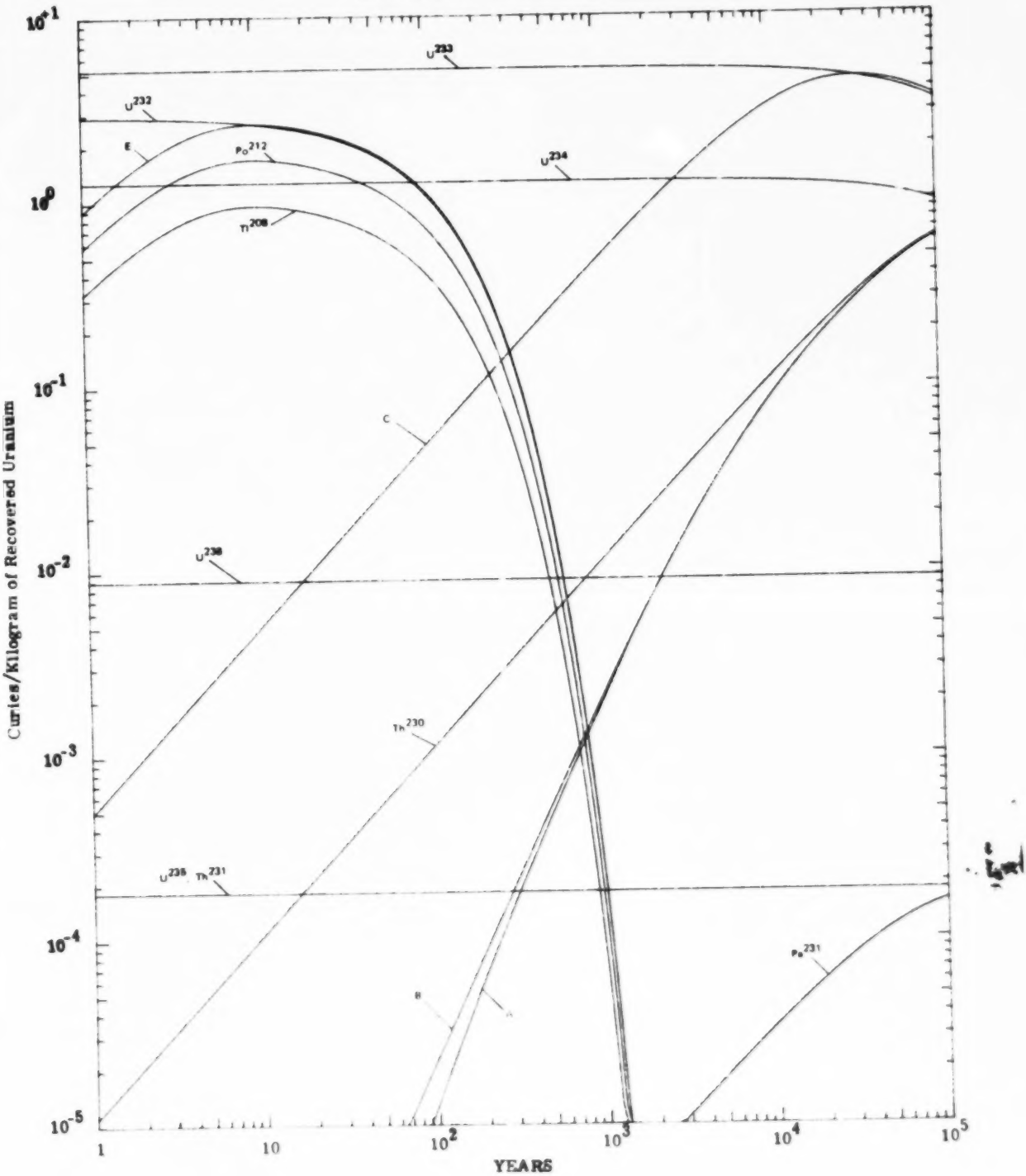


Figure C-15. Significant Actinide Activity In HTGR Plutonium Cycle Recovered Uranium For The Period From 1 to 10^5 Years



APPENDIX D

TABULATION OF ACTINIDE ACTIVITY FOR CASES STUDIED

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Table D1. Significant Actinide Activity From HTGR Initial Core - Spent Fuel

Curies Per Metric Ton of Heavy Metal Charged To Reactor

Year	Th-227	Th-228	Th-229	Pa-229	Pa-233	Pa-231	Pa-232	Pa-234	Np-233	Np-235	Np-236	Np-237
1.00 E 00	2.34E-36	2.31E-31	1.35E-28	9.31E-32	4.04E-27	2.34E-02	2.79E-01	5.11E-06	3.09E-27	2.39E-02	2.74E-01	6.12E-02
2.00 E 00	1.03E-35	1.01E-30	1.23E-27	7.06E-31	6.40E-27	4.36E-02	5.63E-01	7.04E-06	6.99E-27	4.36E-02	1.40E-01	7.84E-02
5.00 E 00	4.13E-35	4.05E-30	2.24E-26	1.63E-30	1.38E-26	9.21E-02	9.75E-01	1.23E-05	1.44E-26	9.21E-02	6.25E-01	1.31E-01
1.00 E 01	2.52E-34	1.57E-29	6.32E-26	3.21E-29	6.48E-26	2.63E-02	6.44E-01	2.53E-05	3.93E-26	2.50E-02	6.66E-01	2.19E-01
2.00 E 01	1.31E-33	8.20E-29	3.31E-25	1.68E-28	1.14E-25	8.13E-01	9.13E-01	5.63E-05	1.44E-25	1.14E-01	6.10E-01	3.95E-01
5.00 E 01	1.13E-31	7.11E-27	2.87E-24	1.46E-27	1.04E-24	7.07E-01	1.03E-01	2.02E-04	8.87E-25	1.44E-01	1.07E-01	9.20E-01
1.00 E 02	1.01E-30	6.33E-26	2.56E-23	1.30E-26	9.31E-24	6.32E-01	1.15E-01	6.03E-04	8.07E-24	2.22E-01	1.93E-01	1.79E-00
2.00 E 02	8.99E-30	5.64E-25	2.28E-22	1.16E-25	8.29E-23	5.62E-01	1.32E-01	1.71E-03	7.21E-23	4.44E-01	7.32E-03	3.52E-00
5.00 E 02	7.99E-29	5.02E-24	2.03E-21	1.03E-24	7.38E-22	5.00E-01	1.24E-01	1.45E-02	6.42E-22	2.22E-01	4.94E-01	4.61E-00
1.00 E 03	7.10E-28	4.46E-23	1.81E-20	9.17E-24	6.57E-21	4.45E-01	9.76E-02	9.76E-02	5.71E-21	1.11E-01	2.24E-01	1.86E-01
2.00 E 03	6.31E-27	3.97E-22	1.61E-19	8.16E-23	5.84E-20	3.96E-01	7.71E-02	6.57E-02	5.08E-20	5.56E-02	1.12E-01	9.32E-02
5.00 E 03	5.61E-26	3.53E-21	1.43E-18	7.26E-22	5.19E-19	3.52E-01	6.09E-02	4.42E-02	4.52E-19	2.78E-02	5.58E-02	4.66E-02
1.00 E 04	4.99E-25	3.14E-20	1.27E-17	6.46E-21	4.62E-18	3.13E-01	4.81E-02	2.97E-02	4.02E-18	1.39E-02	2.79E-02	2.33E-02
2.00 E 04	4.44E-24	2.79E-19	1.13E-16	5.75E-20	4.11E-17	2.79E-01	3.80E-02	2.00E-02	3.58E-17	6.96E-03	1.39E-02	1.16E-02
5.00 E 04	3.95E-23	2.48E-18	1.00E-15	5.12E-19	3.66E-16	2.48E-01	3.00E-02	1.35E-02	3.19E-16	3.48E-03	6.96E-03	5.81E-03
1.00 E 05	3.52E-22	2.21E-17	8.91E-15	4.56E-18	3.26E-15	2.21E-01	2.37E-02	9.09E-03	2.84E-15	1.74E-03	3.48E-03	2.90E-03
2.00 E 05	3.13E-21	1.97E-16	7.93E-14	4.06E-17	2.90E-14	1.97E-01	1.87E-02	6.14E-03	2.53E-14	8.69E-04	1.74E-03	1.45E-03
5.00 E 05	2.79E-20	1.75E-15	7.06E-13	3.62E-16	2.59E-13	1.75E-01	1.48E-02	4.15E-03	2.25E-13	4.34E-04	8.69E-04	7.24E-04
1.00 E 06	2.49E-19	1.56E-14	6.28E-12	3.22E-15	2.30E-12	1.56E-01	1.17E-02	2.80E-03	2.00E-12	2.17E-04	4.34E-04	3.62E-04
2.00 E 06	2.22E-18	1.39E-13	5.59E-11	2.86E-14	2.05E-11	1.39E-01	9.29E-03	1.89E-03	1.78E-11	1.08E-04	2.17E-04	1.81E-04
5.00 E 06	1.98E-17	1.24E-12	4.98E-10	2.55E-13	1.82E-10	1.24E-01	7.37E-03	1.28E-03	1.58E-10	5.42E-05	1.08E-04	9.05E-05
1.00 E 07	1.76E-16	1.10E-11	4.44E-09	2.27E-12	1.62E-09	1.10E-01	5.85E-03	8.64E-04	1.41E-09	2.71E-05	5.42E-05	4.52E-05
2.00 E 07	1.57E-15	9.80E-11	3.95E-08	2.02E-11	1.44E-08	9.80E-02	4.64E-03	5.84E-04	1.25E-08	1.36E-05	2.71E-05	2.26E-05
5.00 E 07	1.40E-14	8.73E-10	3.52E-07	1.80E-10	1.28E-07	8.73E-02	3.68E-03	3.95E-04	1.11E-07	6.78E-06	1.36E-05	1.13E-05
1.00 E 08	1.25E-13	7.78E-09	3.13E-06	1.60E-09	1.14E-06	7.78E-02	2.92E-03	2.67E-04	9.87E-07	3.39E-06	6.78E-06	5.65E-06
2.00 E 08	1.11E-12	6.93E-08	2.79E-05	1.43E-08	1.01E-05	6.93E-02	2.31E-03	1.81E-04	8.78E-06	1.69E-06	3.39E-06	2.82E-06
5.00 E 08	9.91E-12	6.17E-07	2.48E-04	1.27E-07	9.04E-05	6.17E-02	1.83E-03	1.22E-04	7.81E-05	8.47E-07	1.69E-06	1.41E-06
1.00 E 09	8.82E-11	5.49E-06	2.21E-03	1.13E-06	8.04E-04	5.49E-02	1.45E-03	8.26E-05	6.95E-04	4.23E-07	8.47E-07	7.05E-07
2.00 E 09	7.85E-10	4.89E-05	1.96E-02	1.01E-05	7.15E-03	4.89E-02	1.15E-03	5.59E-05	6.18E-03	2.11E-07	4.23E-07	3.52E-07
5.00 E 09	6.98E-09	4.35E-04	1.75E-01	8.98E-05	6.36E-02	4.35E-02	9.13E-04	3.78E-05	5.50E-02	1.05E-07	2.11E-07	1.76E-07
1.00 E 10	6.21E-08	3.87E-03	1.56E+00	7.99E-04	5.66E-01	3.87E-02	7.24E-04	2.56E-05	4.89E-01	5.23E-08	1.05E-07	8.79E-08
2.00 E 10	5.53E-07	3.44E-02	1.39E+01	7.11E-03	5.04E+00	3.44E-02	5.74E-04	1.73E-05	4.35E+00	2.61E-08	5.23E-08	4.39E-08
5.00 E 10	4.92E-06	3.06E-01	1.24E+02	6.33E-02	4.49E+01	3.06E-02	4.55E-04	1.17E-05	3.87E+01	1.30E-08	2.61E-08	2.19E-08
1.00 E 11	4.38E-05	2.72E-00	1.10E+03	5.63E-01	3.99E+02	2.72E-02	3.61E-04	7.91E-06	3.44E+02	6.49E-09	1.30E-08	1.09E-08
2.00 E 11	3.90E-04	2.42E-00	9.80E+03	5.01E+00	3.55E+03	2.42E-02	2.86E-04	5.36E-06	3.06E+03	3.24E-09	6.49E-09	5.41E-09
5.00 E 11	3.47E-03	2.15E-00	8.72E+04	4.46E+01	3.16E+04	2.15E-02	2.27E-04	3.63E-06	2.72E+04	1.62E-09	3.24E-09	2.70E-09
1.00 E 12	3.09E-02	1.91E-00	7.76E+05	3.97E+02	2.81E+05	1.91E-02	1.80E-04	2.46E-06	2.42E+05	8.09E-10	1.62E-09	1.35E-09
2.00 E 12	2.75E-01	1.70E-00	6.91E+06	3.53E+03	2.50E+06	1.70E-02	1.43E-04	1.67E-06	2.15E+06	4.04E-10	8.09E-10	6.74E-10
5.00 E 12	2.45E-00	1.51E-00	6.15E+07	3.14E+04	2.23E+07	1.51E-02	1.13E-04	1.13E-06	1.91E+07	2.02E-10	4.04E-10	3.37E-10
1.00 E 13	2.18E-00	1.35E-00	5.47E+08	2.79E+05	1.98E+08	1.35E-02	8.98E-05	7.68E-07	1.70E+08	1.01E-10	2.02E-10	1.68E-10
2.00 E 13	1.94E-00	1.20E-00	4.87E+09	2.49E+06	1.76E+09	1.20E-02	7.13E-05	5.21E-07	1.51E+09	5.04E-11	1.01E-10	8.41E-11
5.00 E 13	1.73E-00	1.07E-00	4.33E+10	2.22E+07	1.57E+10	1.07E-02	5.66E-05	3.54E-07	1.34E+10	2.52E-11	5.04E-11	4.20E-11
1.00 E 14	1.54E-00	9.53E-01	3.85E+11	1.98E+08	1.40E+11	9.53E-03	4.49E-05	2.40E-07	1.19E+11	1.26E-11	2.52E-11	2.10E-11
2.00 E 14	1.37E-00	8.48E-01	3.43E+12	1.76E+09	1.24E+12	8.48E-03	3.56E-05	1.63E-07	1.06E+12	6.30E-12	1.26E-11	1.05E-11
5.00 E 14	1.22E-00	7.54E-01	3.05E+13	1.57E+10	1.11E+13	7.54E-03	2.82E-05	1.10E-07	9.43E+12	3.15E-12	6.30E-12	5.25E-12
1.00 E 15	1.08E-00	6.71E-01	2.71E+14	1.39E+11	9.87E+13	6.71E-03	2.24E-05	7.46E-08	8.39E+13	1.58E-12	3.15E-12	2.62E-12
2.00 E 15	9.61E-01	5.97E-01	2.41E+15	1.24E+12	8.78E+14	5.97E-03	1.78E-05	5.06E-08	7.46E+14	7.88E-13	1.58E-12	1.31E-12
5.00 E 15	8.55E-01	5.31E-01	2.14E+16	1.10E+13	7.81E+15	5.31E-03	1.41E-05	3.43E-08	6.64E+15	3.94E-13	7.88E-13	6.56E-13
1.00 E 16	7.61E-01	4.72E-01	1.91E+17	9.79E+13	6.95E+16	4.72E-03	1.12E-05	2.33E-08	5.91E+16	1.97E-13	3.94E-13	3.28E-13
2.00 E 16	6.77E-01	4.20E-01	1.70E+18	8.71E+14	6.18E+17	4.20E-03	8.87E-06	1.58E-08	5.26E+17	9.85E-14	1.97E-13	1.64E-13
5.00 E 16	6.02E-01	3.73E-01	1.51E+19	7.75E+15	5.50E+18	3.73E-03	7.02E-06	1.07E-08	4.68E+18	4.93E-14	9.85E-14	8.21E-14
1.00 E 17	5.36E-01	3.32E-01	1.34E+20	6.90E+16	4.89E+19	3.32E-03	5.56E-06	7.26E-09	4.17E+19	2.46E-14	4.93E-14	4.11E-14
2.00 E 17	4.77E-01	2.95E-01	1.19E+21	6.14E+17	4.35E+20	2.95E-03	4.40E-06	4.92E-09	3.71E+20	1.23E-14	2.46E-14	2.05E-14
5.00 E 17	4.24E-01	2.63E-01	1.06E+22	5.46E+18	3.87E+21	2.63E-03	3.48E-06	3.33E-09	3.30E+21	6.16E-15	1.23E-14	1.03E-14
1.00 E 18	3.77E-01	2.34E-01	9.43E+22	4.86E+19	3.44E+22	2.34E-03	2.76E-06	2.26E-09	2.94E+22	3.08E-15	6.16E-15	5.13E-15
2.00 E 18	3.36E-01	2.08E-01	8.39E+23	4.32E+20	3.06E+23	2.08E-03	2.18E-06	1.53E-09	2.61E+23	1.54E-15	3.08E-15	2.56E-15
5.00 E 18	2.99E-01	1.85E-01	7.47E+24	3.85E+21	2.72E+24	1.85E-03	1.73E-06	1.04E-09	2.32E+24	7.70E-16	1.54E-15	1.28E-15
1.00 E 19	2.66E-01	1.65E-01	6.65E+25	3.43E+22	2.42E+25	1.65E-03	1.37E-06	7.04E-10	2.06E+25	3.85E-16	7.70E-16	6.41E-16
2.00 E 19	2.37E-01	1.47E-01	5.92E+26	3.05E+23	2.15E+26	1.47E-03	1.09E-06	4.77E-10	1.83E+26	1.93E-16	3.85E-16	3.21E-16
5.00 E 19	2.11E-01	1.31E-01	5.27E+27	2.72E+24	1.91E+27	1.31E-03	8.64E-07	3.23E-10	1.63E+27	9.64E-17	1.93E-16	1.61E-16
1.00 E 20	1.88E-01	1.17E-01	4.69E+28	2.42E+25	1.70E+28	1.17E-03	6.85E-07	2.19E-10	1.45E+28	4.82E-17	9.64E-17	8.04E-17
2.00 E 20	1.67E-01	1.04E-01	4.17E+29	2.15E+26	1.51E+29	1.04E-03	5.43E-07	1.48E-10	1.29E+29	2.41E-17	4.82E-17	4.02E-17
5.00 E 20	1.49E-01	9.29E-02	3.71E+30	1.91E+27	1.34E+30	9.29E-04	4.30E-07	1.00E-10	1.15E+30	1.21E-17	2.41E-17	2.01E-17
1.00 E 21	1.33E-01	8.27E-02	3.30E+31	1.70E+28	1.19E+31	8.27E-04	3.41E-07	6.77E-11	1.02E+31	6.03E-18	1.21E-17	1.01E-17
2.00 E 21	1.18E-01	7.36E-02	2.94E+32	1.51E+29	1.06E+32	7.36E-04	2.70E-07	4.58E-11	9.08E+31	3.01E-18	6.03E-18	5.03E-18
5.00 E 21	1.05E-01	6.55E-02	2.62E+33	1.35E+30	9.43E+32	6.55E-04	2.14E-07	3.10E-11	8.08E+32	1.50E-18	3.01E-18	2.51E-18
1.00 E 22	9.33E-02	5.83E-02	2.33E+34	1.20E+31	8.39E+33	5.83E-04	1.70E-07	2.10E-11	7.19E+33	7.49E-19	1.50E-18	1.25E-18
2.00 E 22	8.31E-02	5.19E-02	2.07E+35	1.07E+32	7.47E+34	5.19E-04	1.35E-07	1.42E-11	6.40E+34	3.74E-19	7.49E-19	6.24E-19
5.00 E 22	7.40E-02	4.62E-02	1.84E+36	9.51E+32	6.65E+35	4.62E-04	1.07E-07	9.65E-12	5.70E+35	1.87E-19	3.74E-19	3.12E-19
1.00 E 23	6.59E-02	4.11E-02	1.64E+37	8.47E+33	5.92E+36	4.11E-04	8.49E-08	6.54E-12	5.07E+36	9.34E-20	1.87E-19	1.56E-19
2.00 E 23	5.87E-02	3.66E-02	1.46E+38	7.54E+34	5.27E+37	3.66E-04	6.73E-08	4.43E-12	4.52E+37	4.67E-20	9.34E-20	7.79E-20
5.00 E 23	5.23E-02	3.26E-02	1.30E+39	6.72E+35	4.69E+38	3.26E-04	5.34E-08	3.00E-12	4.03E+38	2.33E-20	4.67E-20	3.89E-20
1.00 E 24	4.66E-02	2.90E-02	1.16E+40	5.98E+36	4.18E+39	2.90E-04	4.23E-08	2.03E-12	3.59E+39	1.16E-20	2.33E-20	1.94E-20
2.00 E 24	4.15E-02	2.58E-02	1.03E+41	5.32E+37	3.72E+40	2.58E-04	3.35E-08	1.37E-12	3.20E+40	5.82E-21	1.16E-20	9.72E-21
5.00 E 24	3.70E-02	2.30E-02	9.19E+41	4.74E+38	3.32E+41	2.30E-04	2.65E-08	9.26E-13	2.85E+41	2.91E-21	5.82E-21	4.86E-21
1.00 E 25	3.30E-02	2.05E-02	8.19E+42	4.22E+39	2.96E+42	2.05E-04	2.10E-08	6.26E-13	2.54E+42	1.46E-21	2.91E-21	2.43E-21
2.00 E 25	2.94E-02	1.83E-02	7.30E+43	3.76E+40	2.64E+43	1.83E-04	1.66E-08	4.23E-13	2.26E+43	7.28E-22	1.46E-21	1.21E-21
5.00 E 25	2.62E-02	1.63E-02	6.51E+44	3.35E+41	2.35E+44	1.63E-04	1.32E-08	2.86E-13	2.01E+44	3.64E-22	7.28E-22	6.07E-22
1.00 E 26	2.34E-02	1.45E-02	5.80E+45	2.99E+42	2.09E+45	1.45E-04	1.05E-08	1.93E-13	1.79E+45	1.82E-22	3.64E-22	3.04E-22
2.00 E 26	2.08E-02	1.29E-02	5.17E+46	2.66E+43	1.86E+46	1.29E-04	8.34E-09	1.30E-13	1.59E+46	9.10E-23	1.82E-22	1.52E-22
5.00 E 26	1.85E-02	1.15E-02	4.61E+47	2.37E+44	1.66E+47	1.15E-04	6.62E-09	8.77E-14	1.42E+47	4.55E-23	9.10E-23	7.59E-23
1.00 E 27	1.65E-02	1.02E-02	4.11E+48	2.11E+45	1.48E+48	1.02E-04	5.26E-09	5.91E-14	1.26E+48	2.28E-23	4.55E-23	3.80E-23
2.00 E 27	1.47E-02	9.11E-03	3.66E+49	1.88E+46	1.32E+49	9.11E-05	4.17E-09	3.98E-14	1.12E+49	1.14E-23	2.28E-23	1.90E-23
5.00 E 27	1.31E-02	8.11E-03	3.26E+50	1.67E+47	1.17E+50	8.11E-05	3.31E-09	2.68E-14	9.98E+49	5.69E-24	1.14E-23	9.50E-24
1.00 E 28	1.16E-02	7.22E-03	2.90E+51	1.49E+48	1.04E+51	7.22E-05	2.62E-09	1.80E-14	8.89E+50	2.85E-24	5.69E-24	4.75E-24
2.00 E 28	1.03E-02	6.43E-03	2.58E+52	1.32E+49	9.26E+51	6.43E-05	2.08E-09	1.21E-14	7.91E+51	1.42E-24	2.85E-24	2.37E-24
5.00 E 28	9.17E-03	5.72E-03	2.29E+53	1.18E+50	8.24E+52	5.72E-05	1.65E-09	8.14E-15	7.04E+52	7.12E-25	1.42E-24	1.19E-24
1.00 E 29	8.16E-03	5.09E-03	2.04E+54	1.05E+51	7.33E+53	5.09E-05	1.31E-09	5.48E-15	6.27E+53	3.56E-25	7.12E-25	5.94E-25
2.00 E 29	7.26E-03	4.53E-03	1.81E+55	9.34E+51	6.52E+54	4.53E-05	1.04E-09	3.69E-15	5.58E+54	1.78E-25	3.56E-25	2.97E-25
5.00 E 29	6.46E-03	4.03E-03	1.61E+56	8.31E+52	5.80E+55	4.03E-05	8.26E-10	2.48E-15	4.97E+55	8.91E-26	1.78E-25	1.49E-25
1.00 E 30	5.75E-03	3.59E-03	1.43E+57	7.40E+53	5.16E+56	3.59E-05	6.55E-10	1.67E-15	4.42E+56	4.46E-26	8.91E-26	7.43E-26
2.00 E 30	5.12E-03	3.19E-03	1.28E+58	6.59E+54	4.59E+57	3.19E-05	5.19E-10	1.12E-15	3.94E+57	2.23E-26	4.46E-26	3.72E-26
5.00 E 30	4.56E-03	2.84E-03	1.14E+59	5.87E+55	4.09E+58	2.84E-05	4.11E-10	7.54E-16	3.51E+58	1.12E-26	2.23E-26	1.86E-26
1.00 E 31	4.06E-03	2.53E-03	1.01E+60	5.23E+56	3.64E+59	2.53E-05	3.26E-10	5.07E-16	3.13E+59	5.58E-27	1.12E-26	9.31E-27
2.00 E 31	3.62E-03	2.25E-03	9.02E+60	4.66E+57	3.24E+60	2.25E-05	2.58E-10	3.41E-16	2.79E+60	2.79E-27	5.58E-27	4.65E-27
5.00 E 31	3.22E-03	2.00E-03	8.03E+61	4.15E+58	2.88E+61	2.00E-05	2.05E-10	2.29E-16	2.48E+61	1.39E-27	2.79E-27	2.32E-27
1.00 E 32	2.87E-03	1.78E-03	7.15E+62	3.70E+59	2.57E+62	1.78E-05	1.62E-10	1.54E-16	2.21E+62	6.97E-28	1.39E-27	1.16E-27
2.00 E 32	2.55E-03	1.58E-03	6.37E+63	3.29E+60	2.29E+63	1.58E-05	1.28E-10	1.03E-16	1.96E+63	3.48E-28	6.97E-28	5.81E-28
5.00 E 32	2.27E-03	1.41E-03	5.67E+64	2.93E+61	2.04E+64	1.41E-05	1.01E-10	6.95E-17	1.75E+64	1.74E-28	3.48E-28	2.90E-28
1.00 E 33	2.02E-03	1.25E-03	5.05E+65	2.61E+62	1.81E+65	1.25E-05	7.98E-11	4.67E-17	1.56E+65	8.71E-29	1.74E-28	1.45E-28
2.00 E 33	1.80E-03	1.12E-03	4.49E+66	2.32E+63	1.61E+66	1.12E-05	6.31E-11	3.14E-17	1.39E+66	4.36E-29	8.71E-29	7.26E-29
5.00 E 33	1.60E-03	9.97E-04	4.00E+67	2.07E+64	1.43E+67	9.97E-06	4.99E-11	2.11E-17	1.24E+67	2.18E-29	4.36E-29	3.63E-29
1.00 E 34	1.43E-03	8.88E-04	3.56E+68	1.84E+65	1.27E+68	8.88E-06	3.95E-11	1.42E-17	1.11E+68	1.09E-29	2.18E-29	1.82E-29
2.00 E 34	1.27E-03	7.91E-04	3.17E+69	1.64E+66	1.13E+69	7.91E-06	3.12E-11	9.54E-18	9.89E+68	5.45E-30	1.09E-29	9.08E-30
5.00 E 34	1.13E-03	7.04E-04	2.82E+70	1.46E+67	1.01E+70	7.04E-06	2.47E-11	6.42E-18	8.80E+69	2.72E-30	5.45E-30	4.54E-30
1.00 E 35	1.00E-03	6.26E-04	2.51E+71	1.30E+68	8.96E+70	6.26E-06	1.95E-11	4.32E-18	7.83E+70	1.36E-30	2.72E-30	2.27E-30
2.00 E 35	8.90E-04	5.57E-04	2.23E+72	1.15E+69	7.97E+71	5.57E-06	1.55E-11	2.91E-18	6.97E+71	6.80E-31	1.36E-30	1.13E-30
5.00 E 35	7.92E-04	4.96E-04	1.98E+73	1.02E+70	7.09E+72	4.96E-06	1.23E-11	1.96E-18	6.20E+72	3.40E-31	6.80E-31	5.67E-31
1.00 E 36	7.05E-04	4.41E-04	1.76E+74	9.08E+70	6.31E+73	4.41E-06	9.77E-12	1.32E-18	5.52E+73	1.70E-31	3.40E-31	2.83E-31
2.00 E 36	6.27E-04	3.93E-04	1.57E+75	8.08E+71	5.62E+74	3.93E-06	7.75E-12	8.90E-19	4.91E+74	8.50E-32	1.70E-31	1.42E-31
5.00 E 36	5.58E-04	3.50E-04	1.40E+76	7.19E+72	5.00E+75	3.50E-06	6.15E-12	6.00E-19	4.37E+75	4.25E-32	8.50E-32	7.08E-32
1.00 E 37	4.97E-04	3.12E-04	1.24E+77	6.40E+73	4.45E+76	3.12E-06	4.88E-12	4.05E-19	3.89E+76	2.13E-32	4.25E-32	3.54E-32
2.00 E 37	4.42E-04	2.78E-04	1.11E+78	5.70E+74	3.96E+77	2.78E-06	3.87E-12	2.73E-19	3.46E+77	1.06E-32	2.13E-32	1.77E-32
5.00 E 37	3.94E-04	2.47E-04	9.87E+78	5.07E+75	3.53E+78	2.47E-06	3.07E-12	1.84E-19	3.08E+78	5.32E-33	1.06E-32	8.86E-33
1.00 E 38	3.51E-04	2.20E-04	8.79E+79	4.51E+76	3.14E+79	2.20E-06	2.43E-12	1.24E-19	2.74E+79	2.66E-33	5.32E-33	4.43E-33
2.00 E 38	3.12E-04	1.96E-04	7.83E+80	4.02E+77	2.80E+80	1.96E-06	1.93E-12	8.36E-20	2.44E+80	1.33E-33	2.66E-33	2.22E-33
5.00 E 38	2.78E-04	1.74E-04	6.97E+81	3.58E+78	2.49E+81	1.74E-06	1.53E-12	5.64E-20	2.17E+81	6.65E-34	1.33E-33	1.11E-33
1.00 E 39	2.47E-04	1.55E-04	6.20E+82	3.19E+79	2.22E+82	1.55E-06	1.21E-12	3.80E-20	1.93E+82	3.32E-34	6.65E-34	5.54E-34
2.00 E 39	2.20E-04	1.38E-04	5.52E+83	2.84E+80	1.97E+83	1.38E-06	9.62E-13	2.56E-20	1.72E+83	1.66E-34	3.32E-34	2.77E-34
5.00 E 39	1.96E-04	1.23E-04	4.91E+84	2.53E+81	1.75E+84	1.23E-06	7.64E-13	1.73E-20	1.53E+84	8.30E-35	1.66E-34	1.38E-34
1.00 E 40	1.74E-04	1.09E-04	4.37E+85	2.25E+82	1.56E+85	1.09E-06	6.07E-13	1.16E-20	1.36E+85	4.15E-35	8.30E-35	6.92E-35
2.00 E 40	1.55E-04	9.72E-05	3.89E+86	2.00E+83	1.39E+86	9.72E-07	4.81E-13	7.84E-21	1.21E+86	2.08E-35	4.15E-35	3.46E-35
5.00 E 40	1.38E-04	8.66E-05	3.46E+87	1.78E+84	1.24E+87	8.66E-07	3.81E-13	5.31E-21	1.08E+87	1.04E-35	2.08E-35	1.73E-35
1.00 E 41	1.23E-04	7.71E-05	3.08E+88	1.58E+85	1.10E+88	7.71E-07	3.02E-13	3.60E-21	9.62E+87	5.19E-36	1.04E-35	8.66E-36
2.00 E 41	1.09E-04	6.86E-05	2.74E+89	1.41E+86	9.79E+88	6.86E-07	2.39E-13	2.44E-21	8.56E+88	2.59E-36	5.19E-36	4.33E-36
5.00 E 41	9.72E-05	6.11E-05	2.44E+90	1.25E+87	8.72E+89	6.11E-07	1.90E-13	1.65E-21	7.62E+89	1.29E-36	2.59E-36	2.16E-36
1.00 E 42	8.66E-05	5.44E-05	2.17E+91	1.12E+88	7.77E+90	5.44E-07	1.51E-13	1.12E-21	6.79E+90	6.47E-37	1.29E-36	1.08E-36
2.00 E 42	7.71E-05	4.85E-05	1.94E+92	9.96E+88	6.92E+91	4.85E-07	1.20E-13	7.59E-22	6.05E+91	3.24E-37	6.47E-37	5.39E-37
5.00 E 42	6.87E-05	4.32E-05	1.73E+93	8.87E+89	6.17E+92	4.32E-07	9.52E-14	5.14E-22	5.39E+92	1.62E-37	3.24E-37	2.69E-37
1.00 E 43	6.12E-05	3.85E-05	1.54E+94	7.90E+90	5.49E+93	3.85E-07	7.55E-14	3.48E-22	4.80E+93	8.09E-38	1.62E-37	1.35E-37
2.00 E 43	5.45E-05	3.43E-05	1.37E+95	7.03E+91	4.89E+94	3.43E-07	5.99E-14	2.36E-22	4.27E+94	4.04E-38	8.09E-38	6.73E-38
5.00 E 43	4.85E-05	3.05E-05	1.22E+96	6.26E+92	4.35E+95	3.05E-07	4.75E-14	1.60E-22	3.80E+95	2.02

Table D1. Cont'd

Curies Per Metric Ton of Heavy Metal Charged To Reactor

| Years | Kr-222 | Kr-223 | Kr-224 | Kr-225 | Kr-226 | Kr-227 | Kr-228 | Kr-229 | Kr-230 | Kr-231 | Kr-232 | Kr-233 | Kr-234 | Kr-235 | Kr-236 | Kr-237 | Kr-238 | Kr-239 | Kr-240 | Kr-241 | Kr-242 | Kr-243 | Kr-244 | Kr-245 | Kr-246 | Kr-247 | Kr-248 | Kr-249 | Kr-250 | Kr-251 | Kr-252 | Kr-253 | Kr-254 | Kr-255 | Kr-256 | Kr-257 | Kr-258 | Kr-259 | Kr-260 | Kr-261 | Kr-262 | Kr-263 | Kr-264 | Kr-265 | Kr-266 | Kr-267 | Kr-268 | Kr-269 | Kr-270 | Kr-271 | Kr-272 | Kr-273 | Kr-274 | Kr-275 | Kr-276 | Kr-277 | Kr-278 | Kr-279 | Kr-280 | Kr-281 | Kr-282 | Kr-283 | Kr-284 | Kr-285 | Kr-286 | Kr-287 | Kr-288 | Kr-289 | Kr-290 | Kr-291 | Kr-292 | Kr-293 | Kr-294 | Kr-295 | Kr-296 | Kr-297 | Kr-298 | Kr-299 | Kr-300 | Kr-301 | Kr-302 | Kr-303 | Kr-304 | Kr-305 | Kr-306 | Kr-307 | Kr-308 | Kr-309 | Kr-310 | Kr-311 | Kr-312 | Kr-313 | Kr-314 | Kr-315 | Kr-316 | Kr-317 | Kr-318 | Kr-319 | Kr-320 | Kr-321 | Kr-322 | Kr-323 | Kr-324 | Kr-325 | Kr-326 | Kr-327 | Kr-328 | Kr-329 | Kr-330 | Kr-331 | Kr-332 | Kr-333 | Kr-334 | Kr-335 | Kr-336 | Kr-337 | Kr-338 | Kr-339 | Kr-340 | Kr-341 | Kr-342 | Kr-343 | Kr-344 | Kr-345 | Kr-346 | Kr-347 | Kr-348 | Kr-349 | Kr-350 | Kr-351 | Kr-352 | Kr-353 | Kr-354 | Kr-355 | Kr-356 | Kr-357 | Kr-358 | Kr-359 | Kr-360 | Kr-361 | Kr-362 | Kr-363 | Kr-364 | Kr-365 | Kr-366 | Kr-367 | Kr-368 | Kr-369 | Kr-370 | Kr-371 | Kr-372 | Kr-373 | Kr-374 | Kr-375 | Kr-376 | Kr-377 | Kr-378 | Kr-379 | Kr-380 | Kr-381 | Kr-382 | Kr-383 | Kr-384 | Kr-385 | Kr-386 | Kr-387 | Kr-388 | Kr-389 | Kr-390 | Kr-391 | Kr-392 | Kr-393 | Kr-394 | Kr-395 | Kr-396 | Kr-397 | Kr-398 | Kr-399 | Kr-400 | Kr-401 | Kr-402 | Kr-403 | Kr-404 | Kr-405 | Kr-406 | Kr-407 | Kr-408 | Kr-409 | Kr-410 | Kr-411 | Kr-412 | Kr-413 | Kr-414 | Kr-415 | Kr-416 | Kr-417 | Kr-418 | Kr-419 | Kr-420 | Kr-421 | Kr-422 | Kr-423 | Kr-424 | Kr-425 | Kr-426 | Kr-427 | Kr-428 | Kr-429 | Kr-430 | Kr-431 | Kr-432 | Kr-433 | Kr-434 | Kr-435 | Kr-436 | Kr-437 | Kr-438 | Kr-439 | Kr-440 | Kr-441 | Kr-442 | Kr-443 | Kr-444 | Kr-445 | Kr-446 | Kr-447 | Kr-448 | Kr-449 | Kr-450 | Kr-451 | Kr-452 | Kr-453 | Kr-454 | Kr-455 | Kr-456 | Kr-457 | Kr-458 | Kr-459 | Kr-460 | Kr-461 | Kr-462 | Kr-463 | Kr-464 | Kr-465 | Kr-466 | Kr-467 | Kr-468 | Kr-469 | Kr-470 | Kr-471 | Kr-472 | Kr-473 | Kr-474 | Kr-475 | Kr-476 | Kr-477 | Kr-478 | Kr-479 | Kr-480 | Kr-481 | Kr-482 | Kr-483 | Kr-484 | Kr-485 | Kr-486 | Kr-487 | Kr-488 | Kr-489 | Kr-490 | Kr-491 | Kr-492 | Kr-493 | Kr-494 | Kr-495 | Kr-496 | Kr-497 | Kr-498 | Kr-499 | Kr-500 | Kr-501 | Kr-502 | Kr-503 | Kr-504 | Kr-505 | Kr-506 | Kr-507 | Kr-508 | Kr-509 | Kr-510 | Kr-511 | Kr-512 | Kr-513 | Kr-514 | Kr-515 | Kr-516 | Kr-517 | Kr-518 | Kr-519 | Kr-520 | Kr-521 | Kr-522 | Kr-523 | Kr-524 | Kr-525 | Kr-526 | Kr-527 | Kr-528 | Kr-529 | Kr-530 | Kr-531 | Kr-532 | Kr-533 | Kr-534 | Kr-535 | Kr-536 | Kr-537 | Kr-538 | Kr-539 | Kr-540 | Kr-541 | Kr-542 | Kr-543 | Kr-544 | Kr-545 | Kr-546 | Kr-547 | Kr-548 | Kr-549 | Kr-550 | Kr-551 | Kr-552 | Kr-553 | Kr-554 | Kr-555 | Kr-556 | Kr-557 | Kr-558 | Kr-559 | Kr-560 | Kr-561 | Kr-562 | Kr-563 | Kr-564 | Kr-565 | Kr-566 | Kr-567 | Kr-568 | Kr-569 | Kr-570 | Kr-571 | Kr-572 | Kr-573 | Kr-574 | Kr-575 | Kr-576 | Kr-577 | Kr-578 | Kr-579 | Kr-580 | Kr-581 | Kr-582 | Kr-583 | Kr-584 | Kr-585 | Kr-586 | Kr-587 | Kr-588 | Kr-589 | Kr-590 | Kr-591 | Kr-592 | Kr-593 | Kr-594 | Kr-595 | Kr-596 | Kr-597 | Kr-598 | Kr-599 | Kr-600 | Kr-601 | Kr-602 | Kr-603 | Kr-604 | Kr-605 | Kr-606 | Kr-607 | Kr-608 | Kr-609 | Kr-610 | Kr-611 | Kr-612 | Kr-613 | Kr-614 | Kr-615 | Kr-616 | Kr-617 | Kr-618 | Kr-619 | Kr-620 | Kr-621 | Kr-622 | Kr-623 | Kr-624 | Kr-625 | Kr-626 | Kr-627 | Kr-628 | Kr-629 | Kr-630 | Kr-631 | Kr-632 | Kr-633 | Kr-634 | Kr-635 | Kr-636 | Kr-637 | Kr-638 | Kr-639 | Kr-640 | Kr-641 | Kr-642 | Kr-643 | Kr-644 | Kr-645 | Kr-646 | Kr-647 | Kr-648 | Kr-649 | Kr-650 | Kr-651 | Kr-652 | Kr-653 | Kr-654 | Kr-655 | Kr-656 | Kr-657 | Kr-658 | Kr-659 | Kr-660 | Kr-661 | Kr-662 | Kr-663 | Kr-664 | Kr-665 | Kr-666 | Kr-667 | Kr-668 | Kr-669 | Kr-670 | Kr-671 | Kr-672 | Kr-673 | Kr-674 | Kr-675 | Kr-676 | Kr-677 | Kr-678 | Kr-679 | Kr-680 | Kr-681 | Kr-682 | Kr-683 | Kr-684 | Kr-685 | Kr-686 | Kr-687 | Kr-688 | Kr-689 | Kr-690 | Kr-691 | Kr-692 | Kr-693 | Kr-694 | Kr-695 | Kr-696 | Kr-697 | Kr-698 | Kr-699 | Kr-700 | Kr-701 | Kr-702 | Kr-703 | Kr-704 | Kr-705 | Kr-706 | Kr-707 | Kr-708 | Kr-709 | Kr-710 | Kr-711 | Kr-712 | Kr-713 | Kr-714 | Kr-715 | Kr-716 | Kr-717 | Kr-718 | Kr-719 | Kr-720 | Kr-721 | Kr-722 | Kr-723 | Kr-724 | Kr-725 | Kr-726 | Kr-727 | Kr-728 | Kr-729 | Kr-730 | Kr-731 | Kr-732 | Kr-733 | Kr-734 | Kr-735 | Kr-736 | Kr-737 | Kr-738 | Kr-739 | Kr-740 | Kr-741 | Kr-742 | Kr-743 | Kr-744 | Kr-745 | Kr-746 | Kr-747 | Kr-748 | Kr-749 | Kr-750 | Kr-751 | Kr-752 | Kr-753 | Kr-754 | Kr-755 | Kr-756 | Kr-757 | Kr-758 | Kr-759 | Kr-760 | Kr-761 | Kr-762 | Kr-763 | Kr-764 | Kr-765 | Kr-766 | Kr-767 | Kr-768 | Kr-769 | Kr-770 | Kr-771 | Kr-772 | Kr-773 | Kr-774 | Kr-775 | Kr-776 | Kr-777 | Kr-778 | Kr-779 | Kr-780 | Kr-781 | Kr-782 | Kr-783 | Kr-784 | Kr-785 | Kr-786 | Kr-787 | Kr-788 | Kr-789 | Kr-790 | Kr-791 | Kr-792 | Kr-793 | Kr-794 | Kr-795 | Kr-796 | Kr-797 | Kr-798 | Kr-799 | Kr-800 | Kr-801 | Kr-802 | Kr-803 | Kr-804 | Kr-805 | Kr-806 | Kr-807 | Kr-808 | Kr-809 | Kr-810 | Kr-811 | Kr-812 | Kr-813 | Kr-814 | Kr-815 | Kr-816 | Kr-817 | Kr-818 | Kr-819 | Kr-820 | Kr-821 | Kr-822 | Kr-823 | Kr-824 | Kr-825 | Kr-826 | Kr-827 | Kr-828 | Kr-829 | Kr-830 | Kr-831 | Kr-832 | Kr-833 | Kr-834 | Kr-835 | Kr-836 | Kr-837 | Kr-838 | Kr-839 | Kr-840 | Kr-841 | Kr-842 | Kr-843 | Kr-844 | Kr-845 | Kr-846 | Kr-847 | Kr-848 | Kr-849 | Kr-850 | Kr-851 | Kr-852 | Kr-853 | Kr-854 | Kr-855 | Kr-856 | Kr-857 | Kr-858 | Kr-859 | Kr-860 | Kr-861 | Kr-862 | Kr-863 | Kr-864 | Kr-865 | Kr-866 | Kr-867 | Kr-868 | Kr-869 | Kr-870 | Kr-871 | Kr-872 | Kr-873 | Kr-874 | Kr-875 | Kr-876 | Kr-877 | Kr-878 | Kr-879 | Kr-880 | Kr-881 | Kr-882 | Kr-883 | Kr-884 | Kr-885 | Kr-886 | Kr-887 | Kr-888 | Kr-889 | Kr-890 | Kr-891 | Kr-892 | Kr-893 | Kr-894 | Kr-895 | Kr-896 | Kr-897 | Kr-898 | Kr-899 | Kr-900 | Kr-901 | Kr-902 | Kr-903 | Kr-904 | Kr-905 | Kr-906 | Kr-907 | Kr-908 | Kr-909 | Kr-910 | Kr-911 | Kr-912 | Kr-913 | Kr-914 | Kr-915 | Kr-916 | Kr-917 | Kr-918 | Kr-919 | Kr-920 | Kr-921 | Kr-922 | Kr-923 | Kr-924 | Kr-925 | Kr-926 | Kr-927 | Kr-928 | Kr-929 | Kr-930 | Kr-931 | Kr-932 | Kr-933 | Kr-934 | Kr-935 | Kr-936 | Kr-937 | Kr-938 | Kr-939 | Kr-940 | Kr-941 | Kr-942 | Kr-943 | Kr-944 | Kr-945 | Kr-946 | Kr-947 | Kr-948 | Kr-949 | Kr-950 | Kr-951 | Kr-952 | Kr-953 | Kr-954 | Kr-955 | Kr-956 | Kr-957 | Kr-958 | Kr-959 | Kr-960 | Kr-961 | Kr-962 | Kr-963 | Kr-964 | Kr-965 | Kr-966 | Kr-967 | Kr-968 | Kr-969 | Kr-970 | Kr-971 | Kr-972 | Kr-973 | Kr-974 | Kr-975 | Kr-976 | Kr-977 | Kr-978 | Kr-979 | Kr-980 | Kr-981 | Kr-982 | Kr-983 | Kr-984 | Kr-985 | Kr-986 | Kr-987 | Kr-988 | Kr-989 | Kr-990 | Kr-991 | Kr-992 | Kr-993 | Kr-994 | Kr-995 | Kr-996 | Kr-997 | Kr-998 | Kr-999 | Kr-1000 |
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Table D1. Cont'd.

Curies Per Metric Ton of Heavy Metal Charged To Reactor

YEAR	U-235	U-236	U-238	U-239	U-240	NP-237	NP-239	NP-240M	PU-238	PU-239	PU-240
1.00	2.42E 01	3.13E-02	1.11E 00	1.80E-01	1.90E-03	6.31E-15	1.36E 00	1.40E 00	6.31E-15	2.91E-01	1.17E 00	1.22E 01
2.00	2.32E 01	3.14E-02	1.21E 00	1.72E-01	1.80E-03	9.94E-15	1.36E 00	1.40E 00	9.94E-15	1.80E-01	1.16E 00	1.22E 01
3.00	2.23E 01	3.14E-02	1.31E 00	1.65E-01	1.70E-03	1.56E-14	1.36E 00	1.40E 00	1.56E-14	1.11E-01	1.16E 00	1.22E 01
4.00	2.15E 01	3.14E-02	1.41E 00	1.59E-01	1.64E-03	2.45E-14	1.36E 00	1.40E 00	2.45E-14	6.84E-02	1.16E 00	1.22E 01
5.00	2.08E 01	3.14E-02	1.50E 00	1.53E-01	1.58E-03	3.85E-14	1.36E 00	1.40E 00	3.85E-14	4.22E-02	1.16E 00	1.22E 01
6.00	2.00E 01	3.14E-02	1.59E 00	1.48E-01	1.52E-03	6.05E-14	1.36E 00	1.40E 00	6.05E-14	2.60E-02	1.16E 00	1.22E 01
7.00	1.93E 01	3.14E-02	1.68E 00	1.43E-01	1.47E-03	9.51E-14	1.36E 00	1.40E 00	9.51E-14	1.60E-02	1.16E 00	1.22E 01
8.00	1.86E 01	3.14E-02	1.77E 00	1.38E-01	1.42E-03	1.49E-13	1.36E 00	1.40E 00	1.49E-13	9.87E-03	1.16E 00	1.22E 01
9.00	1.80E 01	3.14E-02	1.86E 00	1.33E-01	1.37E-03	2.34E-13	1.36E 00	1.40E 00	2.34E-13	6.08E-03	1.16E 00	1.22E 01
10.00	1.74E 01	3.14E-02	1.95E 00	1.29E-01	1.32E-03	3.67E-13	1.36E 00	1.40E 00	3.67E-13	3.74E-03	1.16E 00	1.22E 01
11.00	1.68E 01	3.14E-02	2.04E 00	1.24E-01	1.28E-03	5.76E-13	1.36E 00	1.40E 00	5.76E-13	2.30E-03	1.16E 00	1.22E 01
12.00	1.63E 01	3.14E-02	2.13E 00	1.20E-01	1.23E-03	9.04E-13	1.36E 00	1.40E 00	9.04E-13	1.41E-03	1.16E 00	1.22E 01
13.00	1.58E 01	3.14E-02	2.22E 00	1.16E-01	1.19E-03	1.42E-12	1.36E 00	1.40E 00	1.42E-12	8.64E-04	1.16E 00	1.22E 01
14.00	1.53E 01	3.14E-02	2.31E 00	1.12E-01	1.15E-03	2.23E-12	1.36E 00	1.40E 00	2.23E-12	5.29E-04	1.16E 00	1.22E 01
15.00	1.48E 01	3.14E-02	2.40E 00	1.08E-01	1.11E-03	3.50E-12	1.36E 00	1.40E 00	3.50E-12	3.24E-04	1.16E 00	1.22E 01
16.00	1.43E 01	3.14E-02	2.49E 00	1.05E-01	1.07E-03	5.49E-12	1.36E 00	1.40E 00	5.49E-12	1.98E-04	1.16E 00	1.22E 01
17.00	1.39E 01	3.14E-02	2.58E 00	1.01E-01	1.04E-03	8.61E-12	1.36E 00	1.40E 00	8.61E-12	1.21E-04	1.16E 00	1.22E 01
18.00	1.35E 01	3.14E-02	2.67E 00	9.83E-02	1.00E-03	1.35E-11	1.36E 00	1.40E 00	1.35E-11	7.41E-05	1.16E 00	1.22E 01
19.00	1.31E 01	3.14E-02	2.76E 00	9.55E-02	9.72E-04	2.11E-11	1.36E 00	1.40E 00	2.11E-11	4.54E-05	1.16E 00	1.22E 01
20.00	1.27E 01	3.14E-02	2.85E 00	9.28E-02	9.44E-04	3.30E-11	1.36E 00	1.40E 00	3.30E-11	2.78E-05	1.16E 00	1.22E 01
21.00	1.23E 01	3.14E-02	2.94E 00	9.02E-02	9.17E-04	5.16E-11	1.36E 00	1.40E 00	5.16E-11	1.70E-05	1.16E 00	1.22E 01
22.00	1.20E 01	3.14E-02	3.03E 00	8.76E-02	8.91E-04	8.07E-11	1.36E 00	1.40E 00	8.07E-11	1.04E-05	1.16E 00	1.22E 01
23.00	1.16E 01	3.14E-02	3.12E 00	8.51E-02	8.65E-04	1.26E-10	1.36E 00	1.40E 00	1.26E-10	6.37E-06	1.16E 00	1.22E 01
24.00	1.13E 01	3.14E-02	3.21E 00	8.27E-02	8.40E-04	1.97E-10	1.36E 00	1.40E 00	1.97E-10	3.90E-06	1.16E 00	1.22E 01
25.00	1.10E 01	3.14E-02	3.30E 00	8.03E-02	8.16E-04	3.08E-10	1.36E 00	1.40E 00	3.08E-10	2.39E-06	1.16E 00	1.22E 01
26.00	1.07E 01	3.14E-02	3.39E 00	7.80E-02	7.92E-04	4.81E-10	1.36E 00	1.40E 00	4.81E-10	1.46E-06	1.16E 00	1.22E 01
27.00	1.04E 01	3.14E-02	3.48E 00	7.58E-02	7.69E-04	7.51E-10	1.36E 00	1.40E 00	7.51E-10	8.94E-07	1.16E 00	1.22E 01
28.00	1.01E 01	3.14E-02	3.57E 00	7.36E-02	7.47E-04	1.17E-09	1.36E 00	1.40E 00	1.17E-09	5.47E-07	1.16E 00	1.22E 01
29.00	9.85E 00	3.14E-02	3.66E 00	7.15E-02	7.25E-04	1.83E-09	1.36E 00	1.40E 00	1.83E-09	3.34E-07	1.16E 00	1.22E 01
30.00	9.59E 00	3.14E-02	3.75E 00	6.94E-02	7.04E-04	2.85E-09	1.36E 00	1.40E 00	2.85E-09	2.04E-07	1.16E 00	1.22E 01
31.00	9.34E 00	3.14E-02	3.84E 00	6.74E-02	6.83E-04	4.44E-09	1.36E 00	1.40E 00	4.44E-09	1.24E-07	1.16E 00	1.22E 01
32.00	9.09E 00	3.14E-02	3.93E 00	6.54E-02	6.63E-04	6.92E-09	1.36E 00	1.40E 00	6.92E-09	7.58E-08	1.16E 00	1.22E 01
33.00	8.85E 00	3.14E-02	4.02E 00	6.35E-02	6.43E-04	1.08E-08	1.36E 00	1.40E 00	1.08E-08	4.63E-08	1.16E 00	1.22E 01
34.00	8.62E 00	3.14E-02	4.11E 00	6.16E-02	6.24E-04	1.68E-08	1.36E 00	1.40E 00	1.68E-08	2.82E-08	1.16E 00	1.22E 01
35.00	8.39E 00	3.14E-02	4.20E 00	5.98E-02	6.05E-04	2.62E-08	1.36E 00	1.40E 00	2.62E-08	1.72E-08	1.16E 00	1.22E 01
36.00	8.17E 00	3.14E-02	4.29E 00	5.80E-02	5.87E-04	4.08E-08	1.36E 00	1.40E 00	4.08E-08	1.05E-08	1.16E 00	1.22E 01
37.00	7.96E 00	3.14E-02	4.38E 00	5.63E-02	5.69E-04	6.35E-08	1.36E 00	1.40E 00	6.35E-08	6.39E-09	1.16E 00	1.22E 01
38.00	7.75E 00	3.14E-02	4.47E 00	5.46E-02	5.52E-04	9.88E-08	1.36E 00	1.40E 00	9.88E-08	3.89E-09	1.16E 00	1.22E 01
39.00	7.55E 00	3.14E-02	4.56E 00	5.30E-02	5.36E-04	1.54E-07	1.36E 00	1.40E 00	1.54E-07	2.37E-09	1.16E 00	1.22E 01
40.00	7.36E 00	3.14E-02	4.65E 00	5.14E-02	5.20E-04	2.39E-07	1.36E 00	1.40E 00	2.39E-07	1.44E-09	1.16E 00	1.22E 01
41.00	7.18E 00	3.14E-02	4.74E 00	4.99E-02	5.04E-04	3.72E-07	1.36E 00	1.40E 00	3.72E-07	8.77E-10	1.16E 00	1.22E 01
42.00	7.00E 00	3.14E-02	4.83E 00	4.84E-02	4.89E-04	5.79E-07	1.36E 00	1.40E 00	5.79E-07	5.34E-10	1.16E 00	1.22E 01
43.00	6.83E 00	3.14E-02	4.92E 00	4.70E-02	4.75E-04	9.01E-07	1.36E 00	1.40E 00	9.01E-07	3.25E-10	1.16E 00	1.22E 01
44.00	6.66E 00	3.14E-02	5.01E 00	4.56E-02	4.61E-04	1.40E-06	1.36E 00	1.40E 00	1.40E-06	1.98E-10	1.16E 00	1.22E 01
45.00	6.50E 00	3.14E-02	5.10E 00	4.42E-02	4.47E-04	2.18E-06	1.36E 00	1.40E 00	2.18E-06	1.20E-10	1.16E 00	1.22E 01
46.00	6.34E 00	3.14E-02	5.19E 00	4.29E-02	4.33E-04	3.39E-06	1.36E 00	1.40E 00	3.39E-06	7.32E-11	1.16E 00	1.22E 01
47.00	6.19E 00	3.14E-02	5.28E 00	4.16E-02	4.20E-04	5.27E-06	1.36E 00	1.40E 00	5.27E-06	4.46E-11	1.16E 00	1.22E 01
48.00	6.04E 00	3.14E-02	5.37E 00	4.03E-02	4.07E-04	8.19E-06	1.36E 00	1.40E 00	8.19E-06	2.72E-11	1.16E 00	1.22E 01
49.00	5.90E 00	3.14E-02	5.46E 00	3.91E-02	3.95E-04	1.27E-05	1.36E 00	1.40E 00	1.27E-05	1.66E-11	1.16E 00	1.22E 01
50.00	5.76E 00	3.14E-02	5.55E 00	3.79E-02	3.83E-04	1.97E-05	1.36E 00	1.40E 00	1.97E-05	1.01E-11	1.16E 00	1.22E 01
51.00	5.62E 00	3.14E-02	5.64E 00	3.68E-02	3.71E-04	3.05E-05	1.36E 00	1.40E 00	3.05E-05	6.18E-12	1.16E 00	1.22E 01
52.00	5.48E 00	3.14E-02	5.73E 00	3.57E-02	3.60E-04	4.72E-05	1.36E 00	1.40E 00	4.72E-05	3.77E-12	1.16E 00	1.22E 01
53.00	5.35E 00	3.14E-02	5.82E 00	3.46E-02	3.49E-04	7.30E-05	1.36E 00	1.40E 00	7.30E-05	2.30E-12	1.16E 00	1.22E 01
54.00	5.22E 00	3.14E-02	5.91E 00	3.36E-02	3.39E-04	1.13E-04	1.36E 00	1.40E 00	1.13E-04	1.40E-12	1.16E 00	1.22E 01
55.00	5.09E 00	3.14E-02	6.00E 00	3.26E-02	3.29E-04	1.74E-04	1.36E 00	1.40E 00	1.74E-04	8.55E-13	1.16E 00	1.22E 01
56.00	4.97E 00	3.14E-02	6.09E 00	3.16E-02	3.19E-04	2.68E-04	1.36E 00	1.40E 00	2.68E-04	5.22E-13	1.16E 00	1.22E 01
57.00	4.85E 00	3.14E-02	6.18E 00	3.06E-02	3.09E-04	4.12E-04	1.36E 00	1.40E 00	4.12E-04	3.19E-13	1.16E 00	1.22E 01
58.00	4.73E 00	3.14E-02	6.27E 00	2.97E-02	3.00E-04	6.34E-04	1.36E 00	1.40E 00	6.34E-04	1.95E-13	1.16E 00	1.22E 01
59.00	4.62E 00	3.14E-02	6.36E 00	2.88E-02	2.91E-04	9.75E-04	1.36E 00	1.40E 00	9.75E-04	1.19E-13	1.16E 00	1.22E 01
60.00	4.51E 00	3.14E-02	6.45E 00	2.80E-02	2.83E-04	1.50E-03	1.36E 00	1.40E 00	1.50E-03	7.28E-14	1.16E 00	1.22E 01

YEAR	PU-240	PU-241	PU-242	PU-243	AM-241	AM-242M	AM-242	AM-243	AM-244	AM-245	CM-242
1.00	1.39E 01	7.03E 00	2.57E-01	1.15E-07	9.61E-15	2.75E 01	6.53E-01	6.53E-01	3.83E 00	7.92E-16	9.06E-09	3.39E 02
2.00	2.49E 01	7.75E 00	2.57E-01	1.13E-07	9.03E-15	3.49E 01	9.51E-01	9.51E-01	3.80E 00	1.23E-17	8.06E-09	7.39E 01
3.00	2.94E 01	8.35E 00	2.57E-01	1.13E-07	8.50E-15	3.71E 01	9.85E-01	9.85E-01	3.80E 00	2.80E-17	3.50E-10	1.38E 00
4.00	3.29E 01	8.90E 00	2.57E-01	1.13E-07	8.00E-15	3.83E 01	9.85E-01	9.85E-01	3.79E 00	9.80E-17	6.33E-12	3.59E-01
5.00	3.58E 01	9.39E 00	2.57E-01	1.13E-07	7.53E-15	3.92E 01	9.85E-01	9.85E-01	3.79E 00	2.80E-17	2.01E-15	3.61E-01
6.00	3.82E 01	9.81E 00	2.57E-01	1.13E-07	7.09E-15	3.98E 01	9.85E-01	9.85E-01	3.78E 00	9.80E-17	6.27E-26	2.97E-01
7.00	4.03E 01	1.02E 01	2.57E-01	1.13E-07	6.67E-15	4.03E 01	9.85E-01	9.85E-01	3.78E 00	2.80E-17	1.99E-36	2.47E-01
8.00	4.22E 01	1.05E 01	2.57E-01	1.13E-07	6.28E-15	4.07E 01	9.85E-01	9.85E-01	3.78E 00	9.80E-17	0.0	2.17E-01
9.00	4.39E 01	1.08E 01	2.57E-01	1.13E-07	5.91E-15	4.11E 01	9.85E-01	9.85E-01	3.78E 00	2.80E-17	0.0	1.90E-01
10.00	4.55E 01	1.11E 01	2.57E-01	1.13E-07	5.57E-15	4.14E 01	9.85E-01	9.85E-01	3.78E 00	9.80E-17	0.0	1.67E-01
11.00	4.70E 01	1.13E 01	2.57E-01	1.13E-07	5.24E-15	4.17E 01	9.85E-01	9.85E-01	3.78E 00	2.80E-17	0.0	1.47E-01
12.00	4.84E 01	1.16E 01	2.57E-01	1.13E-07	4.94E-15	4.19E 01	9.85E-01	9.85E-01	3.78E 00	9.80E-17	0.0	1.30E-01
13.00	4.97E 01	1.18E 01	2.57E-01	1.13E-07	4.66E-15	4.21E 01	9.85E-01	9.85E-01	3.78E 00	2.80E-17	0.0	1.15E-01
14.00	5.09E 01	1.20E 01	2.57E-01	1.13E-07	4.39E-15	4.23E 01	9.85E-01	9.85E-01	3.78E 00	9.80E-17	0.0	1.02E-01
15.00	5.20E 01	1.22E 01	2.57E-01	1.13E-07	4.14E-15	4.24E 01	9.85E-01	9.85E-01	3.78E 00	2.80E-17	0.0	9.04E-02
16.00	5.31E 01	1.24E 01	2.57E-01	1.13E-07	3.90E-15	4.25E 01	9.85E-01	9.85E-01	3.78E 00	9.80E-17	0.0	8.00E-02
17.00	5.41E 01	1.26E 01	2.57E-01	1.13E-07	3.68E-15	4.26E 01	9.85E-01	9.85E-01	3.78E 00	2.80E-17	0.0	7.08E-02
18.00	5.50E 01	1.28E 01	2.57E-01	1.13E-07	3.47E-15	4.27E 01	9.85E-01	9.85E-01	3.78E 00	9.80E-17	0.0	6.27E-02
19.00	5.59E 01	1.30E 01	2.57E-01	1.13E-07	3.27E-15	4.28E 01	9.85E-01	9.85E-01	3.78E 00	2.80E-17	0.0	5.55E-02
20.00	5.68E 01	1.31E 01	2.57E-01	1.13E-07	3.09E-15	4.29E 01	9.85E-01	9.85E-01	3.78E 00	9.80E-17	0.0	4.92E-02
21.00	5.76E 01	1.33E 01	2.57E-01	1.13E-07	2.91E-15	4.29E 01	9.85E-01	9.85E-01	3.78E 00	2.80E-17	0.0	4.36E-02
22.00	5.84E 01	1.34E 01	2.57E-01	1.13E-07	2.75E-15	4.30E 01	9.85E-01	9.85E-01	3.78E 00	9.80E-17	0.0	3.86E-02
23.00	5.91E 01	1.36E 01	2.57E-01	1.13E-07	2.59E-15	4.30E 01	9.85E-01	9.85E-01	3.78E 00	2.80E-17	0.0	3.42E-02
24.00	5.98E 01	1.37E 01	2.57E-01	1.13E-07	2.45E-15	4.31E 01	9.85E-01	9.85E-01	3.78E 00	9.80E-17	0.0	3.03E-02
25.00	6.05E 01	1.38E 01	2.57E-01	1.13E-07	2.31E-15	4.31E 01	9.85E-01	9.85E-01	3.78E 00	2.80E-17	0.0	2.68E-02
26.00	6.11E 01	1.39E 01	2.57E-01	1.13E-07	2.18E-15	4.31E 01	9.85E-01	9.85E-01	3.78E 00	9.80E-17	0.0	2.38E-02
27.00	6.17E 01	1.40E 01	2.57E-01	1.13E-07	2.05E-15	4.32E 01	9.85E-01	9.85E-01	3.78E 00	2.80E-17	0.0	2.10E-02
28.00	6.23E 01	1.41E 01	2.57E-01	1.13E-07	1.94E-15	4.32E 01	9.85E-01	9.85E-01	3.78E 00	9.80E-17	0.0	1.87E-02
29.00	6.28E 01	1.42E 01	2.57E-01	1.13E-07	1.82E-15	4.32E 01	9.85E-01	9.85E-01	3.78E 00	2.80E-17	0.0	1.66E-02
30.00	6.33E 01	1.43E 01	2.57E-01	1.13E-07	1.72E-15	4.32E 01	9.85E-01	9.85E-01	3.78E 00	9.80E-17	0.0	1.47E-02
31.00	6.38E 01	1.44E 01	2.57E-01	1.13E-07	1.62E-15	4.32E 01	9.85E-01	9.85E-01	3.78E 00	2.80E-17	0.0	1.31E-02
32.00	6.43E 01	1.45E 01	2.57E-01	1.13E-07	1.53E-15	4.32E 01	9.85E-01	9.85E-01	3.78E 00	9.80E-17	0.0	1.16E-02
33.00	6.47E 01	1.46E 01	2.57E-01	1.13E-07	1.44E-15	4.32E 01	9.85E-01	9.85E-01	3.78E 00	2.80E-17	0.0	1.03E-02
34.00	6.52E 01	1.47E 01	2.57E-01	1.13E-07	1.36E-15	4.32E 01	9.85E-01	9.85E-01	3.78E 00	9.80E-17	0.0	9.14E-03
35.00	6.56E 01	1.48E 01	2.57E-01	1.13E-07	1.28E-15	4.32E 01	9.85E-01	9.85E-01	3.78E 00	2.80E-17	0.0	8.08E-03
36.00	6.60E 01	1.49E 01	2.57E-01	1.13E-07	1.21E-15	4.32E 01	9.85E-01	9.85E-01	3.78E 00	9.80E-17	0.0	7.14E-03
37.00	6.64E 01	1.50E 01	2.57E-01	1.13E-07	1.14E-15	4.32E 01	9.85E-01	9.85E-01	3.78E 00	2.80E-17	0.0	6.31E-03
38.00	6.68E 01	1.51E 01	2.57E-01	1.13E-07	1.07E-15	4.32E 01	9.85E-01	9.85E-01	3.78E 00	9.80E-17	0.0	5.58E-03
39.00	6.72E 01	1.52E 01	2.57E-01	1.13E-07	1.01E-15	4.32E 01	9.85E-01	9.85E-01	3.78E 00	2.80E-17	0.0	4.93E-03
40.00	6.76E 01	1.53E 01	2.57E-01	1.13E-07	9.51E-16	4.32E 01	9.85E-01	9.85E-01	3.78E 00	9.80E-17	0.0	4.36E-03
41.00	6.80E 01	1.54E 01	2.57E-01	1.13E-07	8.96E-16	4.32E 01	9.85E-01	9.85E-01	3.78E 00	2.80E-17	0.0	3.85E-03
42.00	6.84E 01	1.55E 01	2.57E-01	1.13E-07	8.44E-16	4.32E 01	9.85E-01	9.85E-01	3.78E 00	9.80E-17	0.0	3.40E-03
43.00	6.88E 01	1.56E 01	2.57E-01	1.13E-07	7.95E-16	4.32E 01	9.85E-01	9.85E-01	3.78E 00	2.80E-17	0.0	3.00E-03
44.00	6.92E 01	1.57E 01	2.57E-01	1.13E-07	7.49E-16	4.32E 01	9.85E-01	9.85E-01	3.78E 00	9.80E-17	0.0	2.65E-03
45.00	6.96E 01	1.58E 01	2.57E-01	1.13E-07	7.05E-16	4.32E 01	9.85E-01	9.85E-01	3.78E 00	2.80E-17	0.0	2.34E-03
46.00	7.00E 01	1.59E 01	2.57E-01	1.13E-07	6.64E-16	4.32E 01	9.85E-01	9.85E-01	3.78E 00	9.80E-17	0.0	2.07E-03
47.00	7.04E 01	1.60E 01	2.57E-01	1.13E-07	6.25E-16	4.32E 01	9.85E-01	9.85E-01	3.78E 00	2.80E-17	0.0	1.83E-03
48.00	7.08E 01	1.61E 01	2.57E-01	1.13E-07	5.89E-16	4.32E 01	9.85E-01	9.85E-01	3.78E 00	9.80E-17	0.0	1.62E-03
49.00	7.12E 01	1.62E 01	2.57E-01	1.13E-07	5.54E-16	4.32E 01	9.85E-01	9.85E-01	3.78E 00	2.80E-17	0.0	1.43E-03
50.00	7.16E 01	1.63E 01	2.57E-01	1.13E-07	5.22E-16	4.32E 01	9.85E-01	9.85E-01	3.78E 00	9.80E-17	0.0	1.27E-03
51.00	7.20E 01	1.64E 01	2.57E-01	1.13E-07	4.91E-16	4.32E 01	9.85E-01	9.85E-01	3.78E 00	2.80E-17	0.0	1.12E-03
52.00	7.24E 01	1.65E 01	2.57E-01	1.13E-07	4.63E-16	4.32E 01	9.85E-01	9.85E-01	3.78E 00	9.80E-17	0.0	9.91E-04
53.00	7.28E 01	1.66E 01	2.57E-01	1.13E-07	4.36E-16	4.32E 01	9.85E-01	9.85E-01	3.78E 00	2.80E-17	0.0	8.76E-04
54.00	7.32E 01	1.67E 01	2.57E-01	1.13E-07	4.11E-16	4.32E 01	9.85E-01	9.85E-01	3.78E 00	9.80E-17	0.0	7.74E-04
55.00	7.36E 01	1.68E 01	2.57E-01	1.13E-07	3.87E-16	4.32E 01	9.85E-01	9.85E-01	3.78E 00	2.80E-17	0.0	6.84E-04
56.00	7.40E 01	1.69E 01	2.57E-01	1.13E-07	3.65E-16	4.32E 01	9.85E-01	9.85E-01	3.78E 00	9.80E-17	0.0	6.04E-04
57.00	7.44E 01	1.70E 01	2.57E-01	1.13E-07	3.44E-16	4.32E 01	9.85E-01	9.85E-01	3.78E 00	2.80E-17	0.0	5.34E-04
58.00	7.48E 01	1.71E 01	2.57E-01	1.13E-07	3.24E-16	4.32E 01	9.85E-01	9.85E-01	3.78E 00	9.80E-17	0.0	4.72E-04
59.00	7.52E 01	1.72E 01	2.57E-01	1.13E-07	3.06E-16	4.32E 01	9.85E-01	9.85E-01	3.78E 00	2.80E-17	0.0	4.17E-04
60.00	7.56E 01	1.73E 01	2.57E-01	1.13E-07	2.88E-16	4.32E 01	9.85E-01	9.85E-01	3.78E 00	9.80E-17	0.0	3.68E-04

Table D1. Cont'd.

Curies Per Metric Ton of Heavy Metal Charged To Reactor

YEAR	CM-243	CM-244	CM-245	CM-246	CM-247	CM-248	CM-249	CM-250	BK-249	BK-250	CF-249	CF-250
1.0E 00	9.43E-21	9.34E-02	7.22E-02	2.94E-02	1.15E-01	6.56E-01	7.37E-17	1.34E-13	6.34E-09	1.39E-13	8.66E-06	2.76E-05
2.0E 00	5.93E-21	5.95E-02	7.22E-02	2.98E-02	1.15E-01	6.59E-01	6.73E-23	1.09E-13	2.69E-09	1.09E-13	9.47E-06	2.62E-05
5.0E 00	5.99E-21	5.22E-02	7.22E-02	2.98E-02	1.15E-01	6.59E-01	1.42E-61	1.08E-13	2.63E-09	1.09E-13	5.04E-06	2.48E-05
1.0E 01	9.99E-21	9.31E-02	7.22E-02	2.98E-02	1.15E-01	6.59E-01	0.0	1.09E-13	6.26E-01	1.09E-13	5.05E-06	1.71E-05
2.0E 01	3.99E-21	2.99E-02	7.24E-02	2.99E-02	1.15E-01	6.59E-01	0.0	1.09E-13	1.39E-10	1.09E-13	9.95E-06	1.01E-05
5.0E 01	2.05E-21	9.32E-01	7.14E-02	2.95E-02	1.13E-01	6.55E-01	0.0	1.09E-13	9.61E-21	1.09E-13	9.65E-06	2.05E-06
1.0E 02	1.99E-21	1.37E 01	7.16E-02	2.93E-02	1.13E-01	6.53E-01	0.0	1.09E-13	1.29E-10	1.09E-13	9.23E-06	1.83E-07
2.0E 02	1.99E-21	1.37E 01	7.13E-02	2.91E-02	1.13E-01	6.51E-01	0.0	1.09E-13	0.0	1.09E-13	8.97E-06	1.60E-10
5.0E 02	1.99E-21	1.37E 01	6.93E-02	2.83E-02	1.10E-01	6.34E-01	0.0	1.09E-13	0.0	1.09E-13	8.71E-06	1.42E-13
1.0E 03	1.99E-21	1.37E 01	6.65E-02	2.72E-02	1.05E-01	6.08E-01	0.0	1.09E-13	0.0	1.09E-13	8.36E-06	1.42E-13
2.0E 03	1.99E-21	1.37E 01	6.09E-02	2.49E-02	9.63E-02	5.57E-01	0.0	1.09E-13	0.0	1.09E-13	7.65E-06	1.42E-13
5.0E 03	1.99E-21	1.37E 01	4.42E-02	1.81E-02	6.99E-02	4.04E-01	0.0	1.09E-13	0.0	1.09E-13	5.55E-06	1.42E-13
1.0E 04	1.99E-21	1.37E 01	2.43E-02	9.94E-03	3.84E-02	2.22E-01	0.0	1.09E-13	0.0	1.09E-13	3.05E-06	1.42E-13
2.0E 04	1.99E-21	1.37E 01	7.33E-03	3.00E-03	1.16E-02	6.70E-02	0.0	1.09E-13	0.0	1.09E-13	9.21E-07	1.42E-13
5.0E 04	1.99E-21	1.37E 01	4.74E-04	1.94E-04	7.50E-04	4.33E-03	0.0	1.09E-13	0.0	1.09E-13	5.96E-08	1.42E-13
1.0E 05	1.99E-21	1.37E 01	1.81E-05	7.41E-06	2.87E-05	1.65E-04	0.0	1.09E-13	0.0	1.09E-13	2.28E-09	1.42E-13
2.0E 05	1.99E-21	1.37E 01	6.91E-07	2.83E-07	1.09E-06	6.30E-06	0.0	1.09E-13	0.0	1.09E-13	8.71E-11	1.42E-13
5.0E 05	1.99E-21	1.37E 01	1.62E-08	6.63E-09	2.56E-08	1.48E-07	0.0	1.09E-13	0.0	1.09E-13	2.04E-12	1.42E-13
1.0E 06	1.99E-21	1.37E 01	2.03E-09	8.31E-10	3.21E-09	1.85E-08	0.0	1.09E-13	0.0	1.09E-13	2.56E-13	1.42E-13
2.0E 06	1.99E-21	1.37E 01	2.54E-10	1.04E-10	4.01E-10	2.32E-09	0.0	1.09E-13	0.0	1.09E-13	3.20E-14	1.42E-13
5.0E 06	1.99E-21	1.37E 01	3.17E-11	1.30E-11	5.01E-11	2.89E-10	0.0	1.09E-13	0.0	1.09E-13	4.00E-15	1.42E-13
1.0E 07	1.99E-21	1.37E 01	3.96E-12	1.62E-12	6.26E-12	3.62E-11	0.0	1.09E-13	0.0	1.09E-13	5.00E-16	1.42E-13

YEAR	CM-251	CM-252	CM-253	CF-249	CF-250
1.0E 00	1.44E-27	1.44E-15	1.56E-14	1.56E-11	1.27E-12
2.0E 00	2.42E-27	9.20E-15	1.02E-13	2.30E-11	1.49E-12
5.0E 00	2.42E-27	6.31E-15	9.93E-14	9.13E-12	1.49E-12
1.0E 01	2.53E-27	5.71E-15	0.0	0.0	5.93E-60
2.0E 01	2.51E-27	9.41E-27	0.0	0.0	0.0
5.0E 01	2.49E-27	1.93E-53	0.0	0.0	0.0
1.0E 02	2.45E-27	3.72E-26	0.0	0.0	0.0
2.0E 02	2.41E-27	1.43E-27	0.0	0.0	0.0
5.0E 02	1.47E-27	1.02E-54	0.0	0.0	0.0
1.0E 03	1.14E-27	0.0	0.0	0.0	0.0
2.0E 03	3.99E-28	0.0	0.0	0.0	0.0
5.0E 03	5.91E-29	0.0	0.0	0.0	0.0
1.0E 04	1.43E-29	0.0	0.0	0.0	0.0
2.0E 04	5.27E-30	0.0	0.0	0.0	0.0
5.0E 04	6.73E-29	0.0	0.0	0.0	0.0
1.0E 05	2.04E-31	0.0	0.0	0.0	0.0
2.0E 05	0.0	0.0	0.0	0.0	0.0
5.0E 05	0.0	0.0	0.0	0.0	0.0
1.0E 06	0.0	0.0	0.0	0.0	0.0
2.0E 06	0.0	0.0	0.0	0.0	0.0
5.0E 06	0.0	0.0	0.0	0.0	0.0
1.0E 07	0.0	0.0	0.0	0.0	0.0
2.0E 07	0.0	0.0	0.0	0.0	0.0
5.0E 07	0.0	0.0	0.0	0.0	0.0
1.0E 08	0.0	0.0	0.0	0.0	0.0

Table D2 Significant Actinide Activity From HTGR Initial Core - High Level Waste

Curies Per Kilogram of Actinides In High Level Waste

YEAR	TL-207	TL-208	TL-209	PB-209	PB-210	PB-211	PB-212	PB-214	BI-210	BI-211	BI-212	BI-213
1.0E 00	1.47E-03	4.52E-08	1.14E-06	5.43E-05	2.39E-08	1.93E-03	2.39E-02	3.05E-07	2.39E-08	1.99E-03	2.39E-02	5.35E-05
2.0E 00	2.95E-03	1.05E-07	3.39E-06	7.12E-05	3.23E-08	2.53E-03	2.95E-02	3.06E-07	3.23E-08	2.53E-03	2.95E-02	7.10E-05
5.0E 00	4.39E-03	2.19E-07	2.71E-06	1.23E-04	3.83E-08	4.05E-03	3.[illegible]E-02	3.11E-07	5.85E-08	4.05E-03	3.72E-02	1.23E-04
1.0E 01	6.24E-03	1.03E-06	9.65E-06	2.13E-04	4.70E-08	8.33E-03	3.88E-02	3.21E-07	9.77E-08	8.33E-03	3.88E-02	2.13E-04
2.0E 01	4.41E-03	1.77E-06	1.64E-05	1.83E-04	1.20E-07	9.89E-03	3.52E-02	3.50E-07	1.65E-07	9.89E-03	3.52E-02	3.85E-04
5.0E 01	1.90E-03	4.29E-06	4.27E-05	4.07E-04	3.73E-07	1.56E-02	2.61E-02	6.58E-07	3.75E-07	1.56E-02	2.61E-02	9.07E-04
1.0E 02	1.29E-04	1.14E-05	1.15E-04	1.77E-03	1.24E-06	1.83E-02	1.61E-02	2.21E-06	1.29E-06	1.83E-02	1.61E-02	1.77E-03
2.0E 02	1.24E-05	2.39E-05	3.63E-04	3.63E-03	4.10E-06	1.94E-02	6.22E-03	1.15E-05	8.13E-06	1.94E-02	6.22E-03	3.49E-03
5.0E 02	1.44E-07	1.03E-04	1.30E-03	8.50E-03	4.15E-05	1.93E-02	9.17E-04	1.05E-04	9.15E-05	1.93E-02	9.17E-04	8.33E-03
1.0E 03	1.86E-08	2.08E-04	3.50E-03	1.09E-02	1.83E-04	7.49E-03	7.49E-05	9.55E-06	9.55E-06	1.08E-02	7.49E-05	1.07E-02
2.0E 03	2.95E-12	2.73E-04	3.50E-03	1.09E-02	1.83E-04	7.49E-03	7.49E-05	9.55E-06	9.55E-06	1.08E-02	7.49E-05	1.07E-02
5.0E 03	1.72E-17	2.73E-04	3.50E-03	1.09E-02	1.83E-04	7.49E-03	7.49E-05	9.55E-06	9.55E-06	1.08E-02	7.49E-05	1.07E-02
1.0E 04	1.72E-17	2.73E-04	3.50E-03	1.09E-02	1.83E-04	7.49E-03	7.49E-05	9.55E-06	9.55E-06	1.08E-02	7.49E-05	1.07E-02
2.0E 04	1.72E-17	2.73E-04	3.50E-03	1.09E-02	1.83E-04	7.49E-03	7.49E-05	9.55E-06	9.55E-06	1.08E-02	7.49E-05	1.07E-02
5.0E 04	1.72E-17	2.73E-04	3.50E-03	1.09E-02	1.83E-04	7.49E-03	7.49E-05	9.55E-06	9.55E-06	1.08E-02	7.49E-05	1.07E-02
1.0E 05	1.72E-17	2.73E-04	3.50E-03	1.09E-02	1.83E-04	7.49E-03	7.49E-05	9.55E-06	9.55E-06	1.08E-02	7.49E-05	1.07E-02
2.0E 05	1.72E-17	2.73E-04	3.50E-03	1.09E-02	1.83E-04	7.49E-03	7.49E-05	9.55E-06	9.55E-06	1.08E-02	7.49E-05	1.07E-02
5.0E 05	1.72E-17	2.73E-04	3.50E-03	1.09E-02	1.83E-04	7.49E-03	7.49E-05	9.55E-06	9.55E-06	1.08E-02	7.49E-05	1.07E-02
1.0E 06	1.72E-17	2.73E-04	3.50E-03	1.09E-02	1.83E-04	7.49E-03	7.49E-05	9.55E-06	9.55E-06	1.08E-02	7.49E-05	1.07E-02

YEAR	BI-214	PO-210	PO-211	PO-212	PO-213	PO-214	PO-215	PO-216	PO-218	AT-217	RN-219	RN-220
1.0E 00	3.05E-07	2.39E-08	5.49E-05	1.58E-02	3.05E-05	3.05E-07	1.99E-03	2.39E-02	3.05E-07	3.05E-05	1.99E-03	2.39E-02
2.0E 00	3.06E-07	2.53E-03	7.54E-05	1.99E-02	3.23E-05	3.23E-07	2.53E-03	2.95E-02	3.06E-07	3.23E-05	2.53E-03	2.95E-02
5.0E 00	3.11E-07	4.05E-03	1.27E-04	2.58E-02	4.12E-05	3.11E-07	4.05E-03	3.72E-02	3.11E-07	4.12E-05	4.05E-03	3.72E-02
1.0E 01	3.21E-07	8.33E-03	2.69E-04	2.69E-02	3.47E-05	3.47E-07	8.33E-03	3.88E-02	3.21E-07	2.12E-05	8.33E-03	3.88E-02
2.0E 01	3.50E-07	1.65E-02	2.27E-04	3.70E-02	3.50E-07	9.89E-03	3.52E-02	3.50E-07	3.03E-05	9.89E-03	3.52E-02	3.85E-04
5.0E 01	9.51E-07	3.73E-02	8.54E-04	1.67E-04	9.87E-06	6.51E-07	1.56E-02	2.61E-02	6.51E-07	9.87E-06	1.56E-02	2.61E-02
1.0E 02	2.21E-06	1.83E-02	5.29E-05	1.03E-04	1.73E-03	2.21E-06	1.83E-02	1.61E-02	2.21E-06	1.77E-03	1.83E-02	1.61E-02
2.0E 02	1.15E-05	1.94E-02	5.73E-05	3.47E-03	3.47E-03	1.13E-05	1.91E-02	6.21E-03	1.15E-05	3.47E-03	1.91E-02	6.21E-03
5.0E 02	1.05E-04	1.93E-02	5.70E-05	2.57E-04	3.37E-03	1.09E-04	1.93E-02	9.17E-04	1.05E-04	8.35E-03	1.93E-02	9.17E-04
1.0E 03	9.55E-06	1.08E-02	5.69E-05	5.03E-03	1.83E-04	9.83E-06	1.88E-02	7.49E-05	9.85E-06	1.67E-02	1.88E-02	7.49E-05
2.0E 03	1.41E-03	1.41E-03	5.62E-05	9.85E-03	3.11E-02	1.91E-03	1.88E-02	7.58E-05	1.91E-03	3.18E-02	1.88E-02	7.58E-05
5.0E 03	9.03E-03	9.03E-03	5.17E-05	9.85E-05	9.11E-02	9.03E-03	1.72E-02	7.58E-05	9.03E-03	9.42E-02	1.72E-02	7.58E-05
1.0E 04	2.34E-02	2.34E-02	9.95E-05	9.85E-05	1.98E-01	2.34E-02	1.55E-02	7.58E-05	2.34E-02	1.12E-01	1.55E-02	7.58E-05
2.0E 04	9.12E-02	9.12E-02	3.72E-05	9.85E-05	1.93E-01	5.12E-02	1.25E-02	7.58E-05	5.12E-02	1.53E-01	1.25E-02	7.58E-05
5.0E 04	1.17E-01	1.17E-01	1.99E-05	9.85E-05	1.93E-01	1.17E-01	6.66E-03	7.58E-05	1.17E-01	1.71E-01	6.66E-03	7.58E-05
1.0E 05	3.41E-01	3.41E-01	1.45E-05	9.85E-05	1.93E-01	1.17E-01	6.66E-03	7.58E-05	1.17E-01	1.71E-01	6.66E-03	7.58E-05
2.0E 05	3.41E-01	3.41E-01	1.45E-05	9.85E-05	1.93E-01	1.17E-01	6.66E-03	7.58E-05	1.17E-01	1.71E-01	6.66E-03	7.58E-05
5.0E 05	3.41E-01	3.41E-01	1.45E-05	9.85E-05	1.93E-01	1.17E-01	6.66E-03	7.58E-05	1.17E-01	1.71E-01	6.66E-03	7.58E-05
1.0E 06	3.41E-01	3.41E-01	1.45E-05	9.85E-05	1.93E-01	1.17E-01	6.66E-03	7.58E-05	1.17E-01	1.71E-01	6.66E-03	7.58E-05

Table D2 Cont'd.

Curies Per Kilogram of Actinides In High Level Waste

Years	AM-242	AM-241	AM-243	AM-242	AM-244	AM-245	RA-226	RA-228	AC-225	AC-227	AC-228	TH-227
1.0E 00	5.35E-07	5.35E-05	2.77E-05	1.98E-03	2.33E-02	5.35E-05	6.05E-07	2.58E-03	5.35E-05	1.98E-03	2.58E-03	1.95E-03
2.0E 00	1.13E-06	7.13E-05	5.53E-05	2.53E-03	2.45E-02	7.13E-05	1.06E-06	2.33E-03	7.13E-05	2.52E-03	2.33E-03	2.49E-03
5.0E 00	3.11E-06	1.23E-04	1.67E-04	9.05E-03	3.72E-02	1.23E-04	3.11E-06	1.79E-03	1.23E-04	9.25E-03	1.73E-03	4.30E-03
1.0E 01	5.13E-06	2.13E-04	4.41E-04	1.34E-02	5.34E-02	2.13E-04	5.13E-06	2.10E-03	2.13E-04	1.37E-02	1.06E-03	6.22E-03
2.0E 01	8.45E-06	3.69E-04	1.16E-03	1.98E-02	7.66E-02	3.69E-04	8.45E-06	2.46E-03	3.69E-04	2.03E-02	4.26E-04	9.70E-03
5.0E 01	1.39E-05	6.37E-04	3.05E-03	2.93E-02	1.10E-01	6.37E-04	1.39E-05	2.88E-03	6.37E-04	3.00E-02	1.50E-02	1.51E-02
1.0E 02	2.28E-05	1.10E-03	8.02E-03	4.33E-02	1.58E-01	1.10E-03	2.28E-05	3.37E-03	1.10E-03	4.43E-02	7.50E-05	1.82E-02
2.0E 02	3.74E-05	1.90E-03	2.11E-02	6.39E-02	2.27E-01	1.90E-03	3.74E-05	3.94E-03	1.90E-03	6.54E-02	7.50E-05	1.83E-02
5.0E 02	6.14E-05	3.27E-03	5.54E-02	9.43E-02	3.26E-01	3.27E-03	6.14E-05	4.60E-03	3.27E-03	9.65E-02	7.50E-05	1.85E-02
1.0E 03	1.01E-04	5.63E-03	1.45E-01	1.39E-01	4.68E-01	5.63E-03	1.01E-04	6.28E-03	5.63E-03	1.42E-01	7.50E-05	1.86E-02
2.0E 03	1.66E-04	9.69E-03	3.80E-01	2.05E-01	6.72E-01	9.69E-03	1.66E-04	8.57E-03	9.69E-03	2.09E-01	7.50E-05	1.87E-02
5.0E 03	2.73E-04	1.67E-02	9.96E-01	3.02E-01	9.65E-01	1.67E-02	2.73E-04	1.17E-02	1.67E-02	3.08E-01	7.50E-05	1.88E-02
1.0E 04	4.49E-04	2.87E-02	2.61E-00	4.45E-01	1.38E-00	2.87E-02	4.49E-04	1.60E-02	2.87E-02	4.54E-01	7.50E-05	1.89E-02
2.0E 04	7.38E-04	4.93E-02	6.84E-00	6.56E-01	1.98E-00	4.93E-02	7.38E-04	2.19E-02	4.93E-02	6.69E-01	7.50E-05	1.91E-02
5.0E 04	1.21E-03	8.47E-02	1.79E-01	9.67E-01	2.84E-00	8.47E-02	1.21E-03	3.00E-02	8.47E-02	9.86E-01	7.50E-05	1.94E-02
1.0E 05	1.99E-03	1.45E-01	4.69E-01	1.43E-00	4.07E-00	1.45E-01	1.99E-03	4.11E-02	1.45E-01	1.45E-00	7.50E-05	1.98E-02
2.0E 05	3.27E-03	2.49E-01	1.23E-00	2.11E-00	5.83E-00	2.49E-01	3.27E-03	5.63E-02	2.49E-01	2.14E-00	7.50E-05	2.04E-02
5.0E 05	5.37E-03	4.27E-01	3.23E-00	3.11E-00	8.35E-00	4.27E-01	5.37E-03	7.71E-02	4.27E-01	3.15E-00	7.50E-05	2.24E-02
1.0E 06	8.81E-03	7.32E-01	8.48E-00	4.58E-00	1.20E-01	7.32E-01	8.81E-03	1.06E-01	7.32E-01	4.64E-00	7.50E-05	2.64E-02
2.0E 06	1.45E-02	1.26E-00	2.23E-01	6.74E-00	1.73E-01	1.26E-00	1.45E-02	1.46E-01	1.26E-00	6.83E-00	7.50E-05	3.44E-02
5.0E 06	2.39E-02	2.17E-00	5.87E-01	9.92E-00	2.49E-01	2.17E-00	2.39E-02	2.01E-01	2.17E-00	1.00E-01	7.50E-05	5.84E-02
1.0E 07	3.93E-02	3.74E-00	1.54E-00	1.46E-01	3.58E-01	3.74E-00	3.93E-02	2.77E-01	3.74E-00	1.47E-01	7.50E-05	1.52E-01
2.0E 07	6.47E-02	6.44E-00	4.04E-00	2.15E-01	5.15E-01	6.44E-00	6.47E-02	3.83E-01	6.44E-00	2.17E-01	7.50E-05	3.96E-01
5.0E 07	1.07E-01	1.11E-01	1.06E-01	3.17E-01	7.40E-01	1.11E-01	1.07E-01	5.30E-01	1.11E-01	3.21E-01	7.50E-05	1.03E-00
1.0E 08	1.77E-01	1.91E-01	2.78E-01	4.68E-01	1.06E-00	1.91E-01	1.77E-01	7.33E-01	1.91E-01	4.74E-01	7.50E-05	2.68E-00

Years	TH-229	TH-228	TH-230	TH-231	TH-232	TH-234	PA-231	PA-233	PA-234M	PA-234	U-232	U-233
1.0E 00	5.35E-05	5.35E-05	5.35E-05	7.58E-03	2.03E-06	1.92E-02	6.56E-03	2.83E-06	2.85E-09	3.97E-02	1.84E-01
2.0E 00	7.13E-05	7.13E-05	7.13E-05	7.58E-03	4.06E-06	1.92E-02	1.11E-01	1.68E-06	1.98E-09	3.95E-02	1.84E-01
5.0E 00	1.23E-04	1.23E-04	1.23E-04	7.58E-03	1.01E-05	1.92E-02	1.10E-01	1.68E-06	1.98E-09	3.87E-02	1.84E-01
1.0E 01	2.13E-04	2.13E-04	2.13E-04	7.58E-03	2.03E-05	1.92E-02	1.10E-01	1.68E-06	1.98E-09	3.71E-02	1.84E-01
2.0E 01	3.69E-04	3.69E-04	3.69E-04	7.58E-03	4.06E-05	1.92E-02	1.10E-01	1.68E-06	1.98E-09	3.38E-02	1.84E-01
5.0E 01	6.37E-04	6.37E-04	6.37E-04	7.58E-03	1.01E-04	1.92E-02	1.10E-01	1.68E-06	1.98E-09	2.53E-02	1.84E-01
1.0E 02	9.85E-04	9.85E-04	9.85E-04	7.58E-03	2.03E-04	1.92E-02	1.10E-01	1.68E-06	1.98E-09	1.56E-02	1.84E-01
2.0E 02	1.50E-03	1.50E-03	1.50E-03	7.58E-03	4.06E-04	1.92E-02	1.10E-01	1.68E-06	1.98E-09	5.97E-03	1.84E-01
5.0E 02	2.28E-03	2.28E-03	2.28E-03	7.58E-03	1.01E-03	1.92E-02	1.10E-01	1.68E-06	1.98E-09	3.32E-04	1.84E-01
1.0E 03	2.97E-03	2.97E-03	2.97E-03	7.58E-03	2.03E-03	1.92E-02	1.10E-01	1.68E-06	1.98E-09	2.70E-06	1.83E-01
2.0E 03	3.58E-03	3.58E-03	3.58E-03	7.58E-03	4.06E-03	1.92E-02	1.10E-01	1.68E-06	1.98E-09	1.70E-10	1.83E-01
5.0E 03	4.22E-03	4.22E-03	4.22E-03	7.58E-03	1.01E-02	1.92E-02	1.10E-01	1.68E-06	1.98E-09	5.38E-23	1.82E-01
1.0E 04	4.58E-03	4.58E-03	4.58E-03	7.58E-03	2.03E-02	1.92E-02	1.10E-01	1.68E-06	1.98E-09	6.29E-44	1.81E-01
2.0E 04	4.59E-03	4.59E-03	4.59E-03	7.58E-03	4.06E-02	1.92E-02	1.10E-01	1.68E-06	1.98E-09	0.0	1.78E-01
5.0E 04	4.59E-03	4.59E-03	4.59E-03	7.58E-03	1.01E-01	1.92E-02	1.10E-01	1.68E-06	1.98E-09	0.0	1.70E-01
1.0E 05	4.59E-03	4.59E-03	4.59E-03	7.58E-03	2.03E-01	1.92E-02	1.10E-01	1.68E-06	1.98E-09	0.0	1.59E-01
2.0E 05	4.59E-03	4.59E-03	4.59E-03	7.58E-03	4.06E-01	1.92E-02	1.10E-01	1.68E-06	1.98E-09	0.0	1.38E-01
5.0E 05	4.59E-03	4.59E-03	4.59E-03	7.58E-03	1.01E-00	1.92E-02	1.10E-01	1.68E-06	1.98E-09	0.0	9.10E-02
1.0E 06	4.59E-03	4.59E-03	4.59E-03	7.58E-03	2.03E-00	1.92E-02	1.10E-01	1.68E-06	1.98E-09	0.0	4.89E-03
2.0E 06	4.59E-03	4.59E-03	4.59E-03	7.58E-03	4.06E-00	1.92E-02	1.10E-01	1.68E-06	1.98E-09	0.0	9.85E-16
5.0E 06	4.59E-03	4.59E-03	4.59E-03	7.58E-03	1.01E-01	1.92E-02	1.10E-01	1.68E-06	1.98E-09	0.0		
1.0E 07	4.59E-03	4.59E-03	4.59E-03	7.58E-03	2.03E-01	1.92E-02	1.10E-01	1.68E-06	1.98E-09	0.0		
2.0E 07	4.59E-03	4.59E-03	4.59E-03	7.58E-03	4.06E-01	1.92E-02	1.10E-01	1.68E-06	1.98E-09	0.0		
5.0E 07	4.59E-03	4.59E-03	4.59E-03	7.58E-03	1.01E-00	1.92E-02	1.10E-01	1.68E-06	1.98E-09	0.0		
1.0E 08	4.59E-03	4.59E-03	4.59E-03	7.58E-03	2.03E-00	1.92E-02	1.10E-01	1.68E-06	1.98E-09	0.0		

Table D2. Cont'd.

Curies Per Kilogram of Actinides In High Level Waste

Years	U-234	U-235	U-236	U-237	U-238	U-240	NP-237	NP-239	NP-240M	PU-236	PU-238	PU-239
1.0E 00	2.33E-02	2.68E-05	6.34E-04	1.51E-02	1.49E-06	5.46E-16	1.10E-01	3.14E-01	4.96E-16	1.99E-02	9.68E 02	1.01E 00
2.0E 00	2.33E-02	2.68E-05	8.33E-04	1.49E-02	1.49E-06	7.84E-16	1.10E-01	3.14E-01	7.84E-16	1.58E-02	9.60E 02	1.01E 00
5.0E 00	2.32E-02	2.68E-05	8.35E-04	1.22E-02	1.49E-06	1.65E-15	1.10E-01	3.14E-01	1.65E-15	7.52E-03	9.38E 02	1.01E 00
1.0E 01	2.71E-02	2.68E-05	8.35E-04	9.89E-03	1.49E-06	3.09E-15	1.10E-01	3.14E-01	3.09E-15	2.23E-03	9.02E 02	1.01E 00
2.0E 01	3.15E-02	2.68E-05	8.36E-04	8.12E-03	1.49E-06	5.97E-15	1.11E-01	3.13E-01	5.97E-15	4.96E-04	8.35E 02	1.01E 00
5.0E 01	4.38E-02	2.68E-05	8.37E-04	4.97E-03	1.49E-06	1.46E-14	1.11E-01	3.12E-01	1.46E-14	1.33E-07	6.61E 02	1.01E 00
1.0E 02	6.11E-02	2.68E-05	8.40E-04	1.37E-03	1.49E-06	2.90E-14	1.11E-01	3.11E-01	2.90E-14	8.93E-13	4.68E 02	1.01E 00
2.0E 02	8.49E-02	2.68E-05	8.40E-04	1.33E-03	1.49E-06	5.78E-14	1.12E-01	3.08E-01	5.78E-14	1.84E-23	2.06E 02	1.01E 00
5.0E 02	1.80E-01	2.68E-05	8.50E-04	1.30E-03	1.49E-06	1.44E-13	1.13E-01	3.00E-01	1.44E-13	3.80E-55	1.99E 01	1.00E 00
1.0E 03	3.71E-01	2.73E-05	9.42E-04	1.32E-03	1.49E-06	2.88E-13	1.14E-01	2.87E-01	2.88E-13	0.0	4.05E-01	9.92E-01
2.0E 03	3.78E-01	2.83E-05	9.95E-04	1.21E-03	1.49E-06	5.75E-13	1.15E-01	2.62E-01	5.75E-13	0.0	1.70E-04	9.72E-01
5.0E 03	3.97E-01	3.41E-05	1.07E-03	9.99E-04	1.50E-06	1.43E-12	1.15E-01	1.99E-01	1.43E-12	0.0	4.35E-12	9.11E-01
1.0E 04	3.92E-01	3.92E-05	1.22E-03	8.23E-04	1.52E-06	2.85E-12	1.15E-01	1.27E-01	2.85E-12	0.0	5.03E-22	8.11E-01
2.0E 04	3.52E-01	4.52E-05	1.39E-03	2.60E-06	1.55E-06	5.65E-12	1.14E-01	5.12E-02	5.65E-12	0.0	1.81E-41	6.31E-01
5.0E 04	3.24E-01	5.99E-05	1.83E-03	2.17E-09	1.64E-06	1.37E-11	1.13E-01	3.38E-03	1.37E-11	0.0	0.0	2.77E-01
1.0E 05	2.91E-01	8.22E-05	2.49E-03	3.27E-14	1.78E-06	2.51E-11	1.12E-01	3.64E-05	2.61E-11	0.0	0.0	6.74E-02
2.0E 05	2.43E-01	1.09E-04	3.29E-03	8.79E-20	2.30E-06	4.10E-11	9.83E-02	9.32E-08	4.14E-11	0.0	0.0	7.41E-03
5.0E 06	2.05E-02	3.69E-05	1.39E-03	5.39E-44	2.99E-06	1.25E-10	8.34E-02	9.13E-09	1.25E-10	0.0	0.0	8.39E-04
1.0E 07	3.27E-05	3.19E-05	1.07E-03	0.0	3.27E-06	1.15E-10	6.52E-03	6.24E-09	1.35E-10	0.0	0.0	6.24E-04
1.0E 08	3.22E-06	5.85E-05	7.87E-05	0.0	3.22E-06	6.30E-11	9.85E-16	1.39E-10	6.36E-11	0.0	0.0	1.39E-10

Years	PU-240	PU-241	PU-242	PU-243	PU-244	AM-241	AM-242M	AM-242	AM-243	AM-244	AM-245	CM-242
1.0E 00	1.98E 00	5.29E 02	2.13E-02	9.52E-09	9.97E-16	2.20E 00	3.75E-02	3.75E-02	3.14E-01	8.40E-19	7.48E-10	2.76E 01
2.0E 00	1.98E 00	5.29E 02	2.13E-02	9.52E-09	1.85E-16	3.20E 00	3.73E-02	3.73E-02	3.14E-01	1.32E-18	3.34E-10	5.80E 00
5.0E 00	1.98E 00	5.29E 02	2.13E-02	9.52E-09	1.05E-15	5.32E 00	3.66E-02	3.68E-02	3.14E-01	2.14E-18	2.97E-11	8.54E-02
1.0E 01	2.01E 00	5.10E 02	2.13E-02	9.52E-09	3.09E-15	9.25E 00	3.60E-02	3.60E-02	3.14E-01	4.32E-18	5.28E-13	2.90E-02
2.0E 01	2.04E 00	2.55E 02	2.13E-02	9.52E-09	5.98E-15	1.98E 01	3.49E-02	3.44E-02	3.13E-01	7.77E-18	1.66E-16	2.82E-02
5.0E 01	2.08E 00	5.13E 01	2.13E-02	9.52E-09	1.46E-14	2.32E 01	3.03E-02	3.00E-02	3.12E-01	1.40E-17	5.16E-27	2.46E-02
1.0E 02	2.09E 00	5.71E 00	2.13E-02	9.52E-09	2.90E-14	2.09E 01	2.39E-02	2.39E-02	3.11E-01	8.78E-17	1.63E-44	1.96E-02
2.0E 02	2.07E 00	5.04E-02	2.13E-02	9.52E-09	5.79E-14	1.70E 01	1.51E-02	1.51E-02	3.08E-01	7.53E-17	0.0	1.24E-02
5.0E 02	2.00E 00	5.73E-03	2.12E-02	9.52E-09	1.44E-13	1.09E 01	3.85E-03	3.85E-03	3.00E-01	1.88E-16	0.0	3.16E-03
1.0E 03	1.93E 00	5.52E-03	2.12E-02	9.52E-09	2.88E-13	4.84E 00	3.94E-04	3.94E-04	2.87E-01	3.75E-16	0.0	3.23E-04
2.0E 03	1.72E 00	5.00E-03	2.12E-02	9.52E-09	5.76E-13	9.71E-01	4.12E-06	4.12E-06	2.62E-01	7.49E-16	0.0	3.37E-06
5.0E 03	1.26E 00	3.98E-03	2.11E-02	9.52E-09	1.44E-12	1.42E-02	4.70E-12	4.71E-12	1.99E-01	1.87E-15	0.0	3.86E-12
1.0E 04	7.57E-01	2.58E-03	2.09E-02	9.52E-09	2.88E-12	2.70E-03	5.69E-22	5.89E-22	1.27E-01	3.71E-15	0.0	4.83E-22
2.0E 04	2.71E-01	1.12E-03	2.05E-02	9.52E-09	5.76E-12	1.12E-03	9.11E-42	9.11E-42	5.12E-02	7.35E-15	0.0	7.50E-42
5.0E 04	1.20E-02	4.93E-05	1.46E-02	9.50E-09	1.37E-11	9.93E-05	0.0	0.0	3.38E-03	1.78E-14	0.0	0.0
1.0E 05	7.43E-05	1.30E-06	1.77E-02	9.48E-09	2.62E-11	1.30E-06	0.0	0.0	3.69E-05	3.40E-14	0.0	0.0
2.0E 05	9.15E-11	3.66E-21	8.53E-03	9.32E-09	4.91E-11	3.47E-21	0.0	0.0	9.32E-09	1.19E-13	0.0	0.0
5.0E 06	1.25E-13	2.24E-39	3.92E-03	9.13E-09	1.25E-10	2.37E-39	0.0	0.0	9.13E-09	1.03E-13	0.0	0.0
1.0E 07	1.35E-10	0.0	2.42E-10	8.29E-09	1.35E-10	0.0	0.0	0.0	6.24E-09	1.78E-13	0.0	0.0
1.0E 08	6.37E-11	0.0	0.0	1.39E-10	6.37E-11	0.0	0.0	0.0	1.39E-10	6.24E-14	0.0	0.0

Table D2. Cont'd.

Curies Per Kilogram of Actinides In High Level Waste

YEAR	CM-243	CM-244	CM-245	CM-246	CM-247	CM-248	CM-249	CM-250	BK-249	BK-250	CF-249	CF-250
1.0E 00	9.49E-02	5.03E 01	5.97E-03	2.43E-03	9.52E-09	3.75E-08	5.84E-18	8.60E-15	9.99E-05	8.60E-15	3.02E-07	2.28E-06
2.0E 00	9.49E-02	5.03E 01	5.97E-03	2.43E-03	9.52E-09	3.75E-08	3.41E-24	8.60E-15	2.23E-05	8.60E-15	3.69E-07	2.10E-06
5.0E 00	9.49E-02	5.03E 01	5.97E-03	2.43E-03	9.52E-09	3.75E-08	1.18E-42	8.60E-15	1.99E-06	8.60E-15	4.15E-07	1.85E-06
1.0E 01	9.49E-02	5.03E 01	5.90E-03	2.43E-03	9.52E-09	3.75E-08	0.0	8.60E-15	3.52E-08	8.60E-15	4.17E-07	1.42E-06
2.0E 01	9.49E-02	5.03E 01	5.90E-03	2.42E-03	9.52E-09	3.75E-08	0.0	8.60E-15	1.11E-11	8.60E-15	4.09E-07	8.34E-07
5.0E 01	9.49E-02	5.03E 01	5.90E-03	2.41E-03	9.52E-09	3.75E-08	0.0	8.59E-15	3.46E-22	8.59E-15	3.86E-07	1.70E-07
1.0E 02	9.47E-02	5.03E 01	5.82E-03	2.40E-03	9.52E-09	3.75E-08	0.0	8.57E-15	1.07E-39	8.57E-15	3.49E-07	1.20E-08
2.0E 02	8.85E-04	5.00E-02	5.87E-03	2.38E-03	9.52E-09	3.75E-08	0.0	8.54E-15	0.0	8.54E-15	2.87E-07	8.00E-11
5.0E 02	9.49E-07	4.92E-07	5.72E-03	2.26E-03	9.52E-09	3.75E-08	0.0	8.49E-15	0.0	8.49E-15	1.59E-07	8.45E-15
1.0E 03	9.49E-11	4.83E-13	5.57E-03	2.10E-03	9.52E-09	3.75E-08	0.0	8.27E-15	0.0	8.27E-15	5.44E-08	8.27E-15
2.0E 03	7.55E-21	4.49E-26	5.03E-03	1.81E-03	9.52E-09	3.74E-08	0.0	7.95E-15	0.0	7.95E-15	8.25E-09	7.95E-15
5.0E 03	4.56E-49	3.97E-15	3.47E-03	1.15E-03	9.52E-09	3.72E-08	0.0	7.05E-15	0.0	7.05E-15	2.25E-11	7.05E-15
1.0E 04	0.0	3.71E-15	2.50E-03	9.53E-04	9.52E-09	3.69E-08	0.0	5.74E-15	0.0	5.78E-15	1.19E-15	5.78E-15
2.0E 04	0.0	3.35E-15	1.13E-03	1.29E-04	9.51E-09	3.51E-08	0.0	3.44E-15	0.0	3.83E-15	3.34E-24	3.88E-15
5.0E 04	0.0	1.77E-14	9.01E-05	1.95E-06	9.50E-09	3.41E-08	0.0	1.17E-15	0.0	1.17E-15	7.32E-50	1.17E-15
1.0E 05	0.0	3.42E-14	1.43E-06	9.77E-10	9.48E-09	3.34E-08	0.0	1.80E-16	0.0	1.80E-16	0.0	1.80E-16
5.0E 05	0.0	1.14E-13	3.66E-21	1.91E-43	9.32E-09	1.40E-08	0.0	1.93E-23	0.0	1.93E-23	0.0	1.93E-23
1.0E 06	0.0	1.09E-13	2.27E-39	6.85E-76	9.13E-09	5.24E-09	0.0	0.0	0.0	0.91E-26	0.0	6.91E-26
1.0E 07	0.0	1.75E-13	0.0	0.0	8.46E-09	1.05E-16	0.0	0.0	0.0	0.0	0.0	0.0
1.0E 08	0.0	9.24E-14	0.0	0.0	1.99E-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0

YEAR	CF-251	CF-252	CF-253	CF-254	ES-253
1.0E 00	2.10E-04	6.99E-06	1.89E-15	1.34E-12	2.13E-13
2.0E 00	2.10E-04	3.49E-06	1.20E-21	1.90E-14	1.10E-18
5.0E 00	2.10E-04	1.75E-06	3.78E-40	7.59E-20	1.49E-34
1.0E 01	2.09E-04	8.72E-07	0.0	0.0	9.99E-61
2.0E 01	2.07E-04	2.49E-08	0.0	0.0	0.0
5.0E 01	2.00E-04	1.33E-11	0.0	0.0	0.0
1.0E 02	1.99E-04	2.71E-17	0.0	0.0	0.0
2.0E 02	1.88E-04	1.14E-28	0.0	0.0	0.0
5.0E 02	1.49E-04	9.33E-53	0.0	0.0	0.0
1.0E 03	9.74E-05	0.0	0.0	0.0	0.0
2.0E 03	4.51E-05	0.0	0.0	0.0	0.0
5.0E 03	4.97E-10	0.0	0.0	0.0	0.0
1.0E 04	9.51E-12	0.0	0.0	0.0	0.0
2.0E 04	9.29E-15	0.0	0.0	0.0	0.0
5.0E 04	3.95E-25	0.0	0.0	0.0	0.0
1.0E 05	7.65E-52	0.0	0.0	0.0	0.0
5.0E 05	0.0	0.0	0.0	0.0	0.0
1.0E 06	0.0	0.0	0.0	0.0	0.0
1.0E 07	0.0	0.0	0.0	0.0	0.0
1.0E 08	0.0	0.0	0.0	0.0	0.0

Table D3. Significant Actinide Activity From HTGR Initial Core - Recovered Uranium

Curies Per Kilogram of Recovered Uranium

YEAR	TL-207	TL-208	TL-209	PB-209	PB-210	PB-211	PB-212	PB-214	BI-210	BI-211	BI-212	AT-213
1.0E 00	1.81E-10	8.80E-02	6.47E-06	2.96E-04	8.49E-12	1.81E-10	2.44E-01	7.90E-10	8.49E-12	1.81E-10	2.44E-01	2.96E-04
2.0E 00	7.19E-10	1.49E-01	1.29E-05	5.89E-04	8.77E-11	7.21E-10	4.13E-01	3.10E-09	6.77E-11	7.21E-10	4.13E-01	5.98E-04
5.0E 00	4.36E-09	2.37E-01	3.23E-05	1.47E-03	1.09E-09	4.37E-09	6.57E-01	1.97E-08	1.04E-09	4.37E-09	6.57E-01	1.47E-03
1.0E 01	1.66E-08	2.54E-01	6.46E-05	2.94E-03	7.49E-09	1.66E-08	7.34E-01	7.89E-08	9.00E-09	1.55E-08	7.34E-01	2.94E-03
2.0E 01	5.99E-08	2.60E-01	1.29E-04	5.87E-03	3.42E-08	6.01E-08	6.84E-01	3.15E-07	5.92E-08	6.01E-08	6.84E-01	5.87E-03
5.0E 01	4.86E-07	1.49E-01	3.22E-04	1.47E-02	7.49E-07	2.87E-07	5.12E-01	1.96E-06	7.49E-07	2.87E-07	5.12E-01	1.47E-02
1.0E 02	7.99E-07	1.14E-01	6.43E-04	2.92E-02	6.43E-06	8.01E-07	3.17E-01	7.78E-06	4.45E-06	8.01E-07	3.17E-01	2.92E-02
2.0E 02	1.42E-06	4.35E-02	1.23E-03	5.82E-02	2.29E-05	1.21E-01	3.07E-05	2.29E-05	1.93E-06	1.21E-01	5.82E-02
5.0E 02	5.81E-06	2.42E-03	3.15E-03	1.43E-01	1.03E-04	5.32E-06	6.73E-03	1.44E-04	1.63E-04	5.32E-06	6.73E-03	1.43E-01
1.0E 03	1.09E-05	1.97E-05	6.10E-03	2.80E-01	2.09E-04	1.09E-05	5.46E-03	6.85E-04	6.47E-04	1.09E-05	5.46E-05	2.80E-01
2.0E 03	2.23E-05	1.93E-09	1.17E-02	5.35E-01	2.40E-04	2.24E-05	5.26E-04	2.40E-03	2.40E-03	2.24E-05	5.20E-09	5.33E-01
5.0E 03	5.40E-05	1.49E-09	2.54E-02	1.15E 00	1.05E-02	5.41E-05	4.15E-04	1.05E-02	1.05E-02	5.41E-05	4.15E-04	1.16E 00
1.0E 04	1.02E-04	2.77E-09	4.07E-02	1.45E 00	2.03E-02	1.03E-04	8.30E-04	2.00E-02	2.00E-02	1.03E-04	8.30E-09	1.85E 00
2.0E 04	1.93E-04	3.99E-09	5.44E-02	2.49E 00	5.82E-02	1.66E-04	1.66E-03	5.82E-02	5.82E-02	1.66E-04	1.66E-08	2.49E 00
5.0E 04	3.50E-04	1.49E-08	5.73E-02	2.59E 00	1.33E-01	3.51E-04	4.15E-08	1.33E-01	1.33E-01	3.51E-04	4.15E-08	2.59E 00
1.0E 05	4.70E-04	2.98E-08	4.65E-02	2.11E 00	2.06E-01	4.72E-04	8.29E-08	2.05E-01	2.06E-01	4.72E-04	8.29E-08	2.11E 00
5.0E 05	5.33E-04	1.49E-07	8.34E-03	3.82E-01	1.49E-01	5.35E-04	4.12E-07	1.48E-01	1.48E-01	5.33E-04	4.12E-07	3.82E-01
1.0E 06	5.33E-04	2.95E-07	9.89E-04	4.49E-02	3.79E-02	5.35E-04	8.18E-07	3.79E-02	3.79E-02	5.33E-04	8.18E-07	4.49E-02
1.0E 07	5.29E-04	2.95E-07	1.23E-13	5.61E-12	3.04E-03	5.30E-04	7.21E-06	3.09E-05	3.09E-05	5.30E-04	7.21E-06	5.61E-12
1.0E 08	4.44E-04	2.70E-05	2.49E-26	1.13E-24	2.90E-05	4.45E-04	2.70E-05	2.96E-05	2.96E-05	4.45E-04	2.70E-05	1.13E-24

YEAR	BI-214	PO-210	PO-211	PO-212	PO-213	PO-214	PO-215	PO-216	PO-218	AT-217	RN-219	RN-220
1.0E 00	7.90E-10	2.70E-12	5.44E-10	1.50E-01	2.07E-04	7.90E-10	1.81E-10	2.44E-01	7.90E-10	2.44E-04	1.81E-10	2.44E-01
2.0E 00	3.10E-09	3.49E-11	2.10E-12	2.63E-01	5.71E-04	3.10E-09	7.21E-10	4.13E-01	3.10E-09	5.88E-04	7.21E-10	4.13E-01
5.0E 00	1.97E-08	7.07E-10	1.31E-11	4.21E-01	1.44E-03	1.97E-08	4.37E-09	6.57E-01	1.97E-08	1.47E-03	4.37E-09	6.57E-01
1.0E 01	7.89E-08	5.70E-09	4.90E-11	4.69E-01	2.87E-03	7.89E-08	1.56E-08	7.34E-01	7.89E-08	2.94E-03	1.66E-08	7.34E-01
2.0E 01	3.15E-07	5.94E-08	1.80E-10	4.38E-01	5.74E-03	3.15E-07	6.01E-08	6.84E-01	3.15E-07	5.87E-03	6.01E-08	6.84E-01
5.0E 01	1.95E-06	7.44E-07	8.52E-10	3.20E-01	1.43E-02	1.70E-06	2.87E-07	5.12E-01	1.96E-06	1.47E-02	2.87E-07	5.12E-01
1.0E 02	7.78E-06	4.45E-06	2.40E-09	2.03E-01	2.86E-02	7.78E-06	8.01E-07	3.17E-01	7.78E-06	2.92E-02	8.01E-07	3.17E-01
2.0E 02	3.07E-05	2.29E-05	5.73E-09	7.73E-02	5.49E-02	3.07E-05	1.43E-06	1.21E-01	3.07E-05	5.82E-02	1.93E-06	1.21E-01
5.0E 02	1.84E-04	1.03E-04	1.60E-08	4.31E-03	1.49E-01	1.84E-04	5.32E-06	6.73E-03	1.84E-04	1.43E-01	5.32E-06	6.73E-03
1.0E 03	6.85E-04	6.47E-04	3.20E-08	3.49E-03	2.79E-01	6.85E-04	1.09E-05	5.46E-05	6.85E-04	2.80E-01	1.09E-05	5.46E-05
2.0E 03	2.40E-03	2.40E-03	6.71E-08	3.30E-09	5.21E-01	2.40E-03	2.24E-05	5.20E-09	2.40E-03	5.33E-01	2.24E-05	5.20E-09
5.0E 03	1.05E-02	1.05E-02	1.62E-07	2.66E-09	1.13E 00	1.05E-02	5.41E-05	4.15E-09	1.05E-02	1.16E 00	5.41E-05	4.15E-09
1.0E 04	2.03E-02	2.03E-02	3.08E-07	5.31E-09	1.81E 00	2.03E-02	1.03E-04	8.30E-09	2.68E-02	1.85E 00	1.03E-04	8.30E-09
2.0E 04	5.82E-02	5.82E-02	5.56E-07	1.08E-08	2.49E 00	5.82E-02	1.86E-04	1.66E-08	5.82E-02	2.49E 00	1.86E-04	1.66E-08
5.0E 04	1.33E-01	1.33E-01	1.05E-06	2.63E-08	2.59E 00	1.33E-01	3.51E-04	4.15E-08	1.33E-01	2.59E 00	3.51E-04	4.15E-08
1.0E 05	2.06E-01	2.06E-01	1.42E-06	5.31E-08	2.07E 00	2.06E-01	4.72E-04	8.29E-08	2.06E-01	2.11E 00	4.72E-04	8.29E-08
5.0E 05	1.48E-01	1.48E-01	1.60E-06	2.66E-07	3.73E-01	1.48E-01	5.35E-04	4.12E-07	1.48E-01	3.82E-01	5.35E-04	4.12E-07
1.0E 06	3.79E-02	3.79E-02	1.50E-06	5.24E-07	4.59E-02	3.79E-02	5.35E-04	8.18E-07	3.79E-02	4.49E-02	5.35E-04	8.18E-07
1.0E 07	3.09E-05	3.09E-05	1.53E-06	4.61E-06	2.49E-12	3.09E-05	5.30E-04	7.21E-06	3.09E-05	5.30E-04	7.21E-06	5.61E-12
1.0E 08	2.96E-05	2.96E-05	1.46E-06	1.72E-05	1.11E-24	2.96E-05	4.85E-04	2.70E-05	2.96E-05	1.13E-24	4.85E-04	2.70E-05

Table D3. Cont'd.

Curies Per Kilogram of Recovered Uranium

YEAR	RN-222	FR-221	FR-223	RA-223	RA-224	RA-225	RA-226	RA-228	AC-225	AC-227	AC-228	TH-227
1.0E 00	7.70E-10	2.49E-04	2.56E-12	1.81E-10	2.44E-01	2.49E-04	7.90E-10	4.15E-14	2.94E-04	1.81E-10	4.15E-14	1.79E-10
2.0E 00	3.16E-09	5.88E-04	1.01E-11	7.21E-10	9.13E-01	5.88E-04	3.16E-09	1.61E-13	5.88E-04	7.19E-10	1.61E-13	7.11E-10
5.0E 00	1.97E-08	1.47E-03	6.11E-11	4.37E-09	5.57E-01	1.47E-03	1.97E-08	9.10E-13	1.47E-03	4.36E-09	9.10E-13	4.31E-09
1.0E 01	7.49E-08	2.49E-03	2.32E-10	1.65E-08	7.34E-01	2.49E-03	7.83E-08	3.13E-12	2.94E-03	1.66E-08	3.13E-12	1.64E-08
2.0E 01	3.15E-07	5.87E-03	8.40E-10	6.01E-08	5.04E-01	5.87E-03	3.15E-07	9.59E-12	5.87E-03	6.00E-08	9.60E-12	5.92E-08
5.0E 01	1.90E-06	1.47E-02	4.02E-09	2.87E-07	3.12E-01	1.47E-02	1.96E-06	3.35E-11	1.47E-02	2.87E-07	3.35E-11	2.83E-07
1.0E 02	7.78E-06	2.92E-02	1.12E-08	8.01E-07	3.17E-01	2.92E-02	7.78E-06	7.50E-11	2.92E-02	8.00E-07	7.50E-11	7.90E-07
2.0E 02	3.07E-05	5.80E-02	2.09E-08	1.93E-06	4.21E-01	5.82E-02	3.07E-05	1.58E-10	5.82E-02	1.92E-06	1.58E-10	1.90E-06
5.0E 02	1.89E-04	1.43E-01	7.49E-08	5.32E-06	8.73E-03	1.43E-01	1.84E-04	4.15E-10	1.43E-01	5.32E-06	4.15E-10	5.25E-06
1.0E 03	6.85E-04	4.63E-01	1.93E-07	1.09E-05	5.49E-05	2.60E-01	6.85E-04	8.30E-10	2.80E-01	1.09E-05	8.30E-10	1.08E-05
2.0E 03	2.49E-03	5.33E-01	3.13E-07	2.24E-05	5.25E-09	5.33E-01	2.40E-03	1.66E-09	5.33E-01	2.24E-05	1.66E-09	2.20E-05
5.0E 03	1.05E-02	1.15E 00	7.56E-07	5.41E-05	4.15E-09	1.16E 00	1.05E-02	4.15E-09	1.16E 00	5.41E-05	4.15E-09	5.34E-05
1.0E 04	2.66E-02	1.49E 00	1.99E-06	1.03E-04	8.30E-09	1.49E 00	2.08E-02	8.30E-09	1.49E 00	1.03E-04	8.30E-09	1.01E-04
2.0E 04	9.52E-02	1.49E 00	6.00E-06	1.80E-04	1.66E-08	2.49E 00	5.62E-02	1.66E-08	2.49E 00	1.80E-04	1.66E-08	1.83E-04
5.0E 04	1.33E-01	2.49E 00	6.01E-06	3.51E-04	4.15E-08	2.49E 00	1.33E-01	4.15E-08	2.49E 00	3.51E-04	4.15E-08	3.46E-04
1.0E 05	2.33E-01	2.11E 00	6.01E-06	4.72E-04	8.29E-08	2.11E 00	2.36E-01	8.29E-08	2.11E 00	4.72E-04	8.29E-08	4.65E-04
2.0E 05	3.72E-01	1.49E 00	6.01E-06	5.33E-04	4.12E-07	3.92E-01	1.46E-01	4.12E-07	3.82E-01	5.35E-04	4.12E-07	5.27E-04
5.0E 05	3.09E-01	5.01E-12	7.49E-06	5.30E-04	3.13E-07	4.49E-02	3.79E-02	8.18E-07	4.49E-02	5.33E-04	8.18E-07	5.27E-04
1.0E 06	2.96E-01	1.13E-24	6.79E-06	4.85E-04	2.70E-05	1.13E-24	2.96E-05	2.70E-05	1.13E-24	4.85E-04	2.70E-05	4.78E-04

YEAR	TH-229	TH-229	TH-230	TH-231	TH-232	TH-234	PA-231	PA-233	PA-234M	PA-234	U-232	U-233
1.0E 00	2.49E-04	2.49E-04	3.95E-06	5.32E-04	8.30E-13	3.01E-05	1.14E-08	1.52E-10	3.01E-05	3.01E-08	7.49E-01	3.09E 00
2.0E 00	9.12E-01	5.93E-04	7.24E-06	5.32E-04	1.00E-12	3.01E-05	2.29E-08	1.52E-10	3.01E-05	3.01E-08	7.92E-01	3.09E 00
5.0E 00	6.55E-01	1.47E-03	1.32E-05	5.32E-04	1.21E-12	3.01E-05	5.73E-08	1.32E-10	3.01E-05	3.01E-08	7.69E-01	3.09E 00
1.0E 01	7.31E-01	2.49E-03	3.65E-05	5.32E-04	3.30E-12	3.01E-05	1.15E-07	1.32E-10	3.01E-05	3.01E-08	7.83E-01	3.09E 00
2.0E 01	6.83E-01	5.87E-03	7.24E-05	5.32E-04	1.00E-11	3.01E-05	2.29E-07	1.32E-10	3.01E-05	3.01E-08	6.66E-01	3.09E 00
5.0E 01	3.42E-01	1.47E-02	1.80E-04	5.32E-04	4.15E-11	3.01E-05	5.71E-07	1.32E-10	3.01E-05	3.01E-08	4.44E-01	3.09E 00
1.0E 02	3.17E-01	2.92E-02	3.59E-04	5.32E-04	8.30E-11	3.01E-05	1.14E-06	1.32E-10	3.01E-05	3.01E-08	3.08E-01	3.09E 00
2.0E 02	1.21E-01	5.82E-02	7.24E-04	5.32E-04	1.66E-10	3.01E-05	2.29E-06	1.32E-10	3.01E-05	3.01E-08	1.18E-01	3.09E 00
5.0E 02	6.73E-03	1.43E-01	1.82E-03	5.32E-04	4.15E-10	3.01E-05	5.68E-06	1.32E-10	3.01E-05	3.01E-08	6.55E-03	3.09E 00
1.0E 03	5.46E-05	2.63E-01	3.53E-03	5.32E-04	8.30E-10	3.01E-05	1.13E-05	1.32E-10	3.01E-05	3.01E-08	5.31E-05	3.08E 00
2.0E 03	5.26E-03	5.33E-01	7.21E-03	5.32E-04	1.66E-09	3.01E-05	2.25E-05	1.32E-10	3.01E-05	3.01E-08	3.50E-09	3.07E 00
5.0E 03	4.15E-04	1.13E 00	1.77E-02	5.32E-04	4.13E-09	3.01E-05	5.61E-05	1.32E-10	3.01E-05	3.01E-08	1.00E-21	3.03E 00
1.0E 04	8.30E-04	1.49E 00	3.49E-02	5.32E-04	8.30E-09	3.01E-05	1.03E-04	1.32E-10	3.01E-05	3.01E-08	1.24E-42	2.97E 00
2.0E 04	1.50E-03	2.49E 00	6.91E-02	5.32E-04	1.65E-08	3.01E-05	1.65E-04	1.31E-10	3.01E-05	3.01E-08	0.0	2.84E 00
5.0E 04	4.15E-03	2.49E 00	1.37E-01	5.32E-04	4.15E-08	3.01E-05	3.51E-04	1.30E-10	3.01E-05	3.01E-08	0.0	2.50E 00
1.0E 05	8.29E-03	2.11E 00	2.63E-01	5.32E-04	8.29E-08	3.01E-05	4.72E-04	1.28E-10	3.01E-05	3.01E-08	0.0	2.02E 00
2.0E 05	9.16E-03	1.49E 00	1.49E-01	5.32E-04	4.12E-07	3.01E-05	5.35E-04	1.12E-10	3.01E-05	3.01E-08	0.0	3.64E-01
5.0E 05	8.18E-03	5.49E-02	3.79E-02	5.34E-04	8.18E-07	3.01E-05	5.34E-04	4.57E-11	3.01E-05	3.01E-08	0.0	4.29E-02
1.0E 06	7.21E-06	5.03E-12	3.07E-05	5.30E-04	7.21E-06	3.00E-05	5.30E-04	5.14E-12	3.00E-05	3.00E-08	0.0	5.61E-12
2.0E 06	2.70E-05	1.13E-24	2.96E-05	4.85E-04	2.70E-05	2.96E-05	4.85E-04	1.13E-24	2.96E-05	2.96E-08	0.0	1.13E-24

Table D3. Cont'd.

Curies Per Kilogram of Recovered Uranium

Years	U-234	U-235	U-236	U-237	U-238	NP-237	PU-240
1.0E 03	9.21E-21	9.49E-29	1.59E-22	7.49E-19	3.03E-05	1.32E-10	1.30E-23
2.0E 03	9.21E-21	9.49E-29	1.59E-22	9.24E-32	3.03E-05	1.32E-10	1.30E-23
5.0E 03	9.21E-21	9.49E-29	1.59E-22	0.0	3.03E-05	1.32E-10	1.30E-23
1.0E 04	9.21E-21	9.49E-29	1.59E-22	0.0	3.03E-05	1.32E-10	1.30E-23
2.0E 04	9.21E-21	9.49E-29	1.59E-22	0.0	3.03E-05	1.32E-10	1.30E-23
5.0E 04	9.21E-21	9.49E-29	1.59E-22	0.0	3.03E-05	1.32E-10	1.30E-23
1.0E 05	9.21E-21	9.49E-29	1.59E-22	0.0	3.03E-05	1.32E-10	1.30E-23
2.0E 05	9.21E-21	9.49E-29	1.59E-22	0.0	3.03E-05	1.32E-10	1.30E-23
5.0E 05	9.21E-21	9.49E-29	1.59E-22	0.0	3.03E-05	1.32E-10	1.30E-23
1.0E 06	9.21E-21	9.49E-29	1.59E-22	0.0	3.03E-05	1.32E-10	1.30E-23
2.0E 06	9.21E-21	9.49E-29	1.59E-22	0.0	3.03E-05	1.32E-10	1.30E-23
5.0E 06	9.21E-21	9.49E-29	1.59E-22	0.0	3.03E-05	1.32E-10	1.30E-23
1.0E 07	9.21E-21	9.49E-29	1.59E-22	0.0	3.03E-05	1.32E-10	1.30E-23
2.0E 07	9.21E-21	9.49E-29	1.59E-22	0.0	3.03E-05	1.32E-10	1.30E-23
5.0E 07	9.21E-21	9.49E-29	1.59E-22	0.0	3.03E-05	1.32E-10	1.30E-23
1.0E 08	9.21E-21	9.49E-29	1.59E-22	0.0	3.03E-05	1.32E-10	1.30E-23
2.0E 08	9.21E-21	9.49E-29	1.59E-22	0.0	3.03E-05	1.32E-10	1.30E-23
5.0E 08	9.21E-21	9.49E-29	1.59E-22	0.0	3.03E-05	1.32E-10	1.30E-23
1.0E 09	9.21E-21	9.49E-29	1.59E-22	0.0	3.03E-05	1.32E-10	1.30E-23
2.0E 09	9.21E-21	9.49E-29	1.59E-22	0.0	3.03E-05	1.32E-10	1.30E-23
5.0E 09	9.21E-21	9.49E-29	1.59E-22	0.0	3.03E-05	1.32E-10	1.30E-23
1.0E 10	9.21E-21	9.49E-29	1.59E-22	0.0	3.03E-05	1.32E-10	0.0
2.0E 10	9.21E-21	9.49E-29	1.59E-22	0.0	3.03E-05	1.32E-10	0.0
5.0E 10	9.21E-21	9.49E-29	1.59E-22	0.0	3.03E-05	1.32E-10	0.0
1.0E 11	9.21E-21	9.49E-29	1.59E-22	0.0	3.03E-05	9.57E-11	0.0
2.0E 11	9.21E-21	9.49E-29	1.59E-22	0.0	3.03E-05	9.48E-22	0.0
1.0E 12	2.49E-23	9.49E-29	9.24E-24	0.0	2.90E-05	1.43E-24	0.0

Table D4. Significant Actinide Activity From HTGR Equilibrium Fuel Cycle - Spent Fuel

Curies Per Metric Ton of Heavy Metal Charged To Reactor

YEAR	TL-207	TL-208	TL-209	PB-209	PB-210	PB-211	PB-212	PB-214	BI-210	BI-211	BI-212	BI-213
1.0E 00	5.00E-02	9.09E-01	2.99E-01	1.12E-01	5.13E-07	3.07E-02	1.12E 02	6.37E-06	5.18E-07	3.07E-04	1.12E 02	1.12E-01
2.0E 00	5.00E-02	9.09E-01	2.91E-01	1.3+E-01	5.14E-07	3.57E-02	1.19E 02	1.12E-05	5.15E-07	3.87E-02	1.19E 02	1.32E-01
3.0E 00	5.00E-02	9.09E-01	8.4E-01	1.93E-01	5.14E-07	3.57E-02	1.27E 02	2.33E-05	2.20E-05	3.98E-02	1.27E 02	1.43E-01
4.0E 00	4.91E-02	9.09E-01	8.07E-01	2.73E-01	5.09E-07	9.33E-02	1.20E 02	4.23E-05	6.99E-06	9.33E-02	1.20E 02	2.94E-01
5.0E 00	1.00E-01	9.13E-01	1.10E 00	3.90E-01	6.33E-03	1.99E-01	1.15E 02	9.77E-05	2.39E-05	1.85E-01	1.15E 02	4.96E-01
6.0E 00	1.50E-01	1.13E 00	1.10E 00	5.04E-01	2.28E-01	8.59E 01	9.74E-04	1.73E-04	2.28E-04	8.59E 01	1.10E 00	
7.0E 00	2.00E-01	1.70E 00	9.37E-01	6.11E-01	5.22E-01	5.11E 01	1.34E-03	8.27E-04	2.09E-01	5.11E 01	2.11E 00	
8.0E 00	2.49E-01	2.42E 00	9.10E 00	6.93E-03	2.47E-01	2.23E 01	5.22E-03	3.85E-03	2.78E-01	2.03E 01	4.10E 00	
9.0E 00	2.98E-01	3.04E 00	2.50E-02	2.77E-01	1.22E 00	2.49E-02	2.50E-01	2.77E-01	1.22E 00	9.47E 00		
1.0E 01	3.47E-01	3.03E-02	2.79E-01	2.79E-01	1.21E-01	1.12E-01	1.21E-01	1.21E-01	2.79E-01	1.01E-01		
1.1E 01	3.96E-01	3.03E-02	2.79E-01	2.79E-01	1.21E-01	1.12E-01	1.21E-01	1.21E-01	2.79E-01	1.01E-01		
1.2E 01	4.45E-01	3.03E-02	2.79E-01	2.79E-01	1.21E-01	1.12E-01	1.21E-01	1.21E-01	2.79E-01	1.01E-01		
1.3E 01	4.94E-01	3.03E-02	2.79E-01	2.79E-01	1.21E-01	1.12E-01	1.21E-01	1.21E-01	2.79E-01	1.01E-01		
1.4E 01	5.43E-01	3.03E-02	2.79E-01	2.79E-01	1.21E-01	1.12E-01	1.21E-01	1.21E-01	2.79E-01	1.01E-01		
1.5E 01	5.92E-01	3.03E-02	2.79E-01	2.79E-01	1.21E-01	1.12E-01	1.21E-01	1.21E-01	2.79E-01	1.01E-01		
1.6E 01	6.41E-01	3.03E-02	2.79E-01	2.79E-01	1.21E-01	1.12E-01	1.21E-01	1.21E-01	2.79E-01	1.01E-01		
1.7E 01	6.90E-01	3.03E-02	2.79E-01	2.79E-01	1.21E-01	1.12E-01	1.21E-01	1.21E-01	2.79E-01	1.01E-01		
1.8E 01	7.39E-01	3.03E-02	2.79E-01	2.79E-01	1.21E-01	1.12E-01	1.21E-01	1.21E-01	2.79E-01	1.01E-01		
1.9E 01	7.88E-01	3.03E-02	2.79E-01	2.79E-01	1.21E-01	1.12E-01	1.21E-01	1.21E-01	2.79E-01	1.01E-01		
2.0E 01	8.37E-01	3.03E-02	2.79E-01	2.79E-01	1.21E-01	1.12E-01	1.21E-01	1.21E-01	2.79E-01	1.01E-01		

YEAR	PO-210	PO-211	PO-212	PO-213	PO-214	PO-215	PO-216	PO-218	AT-217	RN-219	RN-220
1.0E 00	6.37E-02	5.93E-07	7.23E-05	7.13E-01	1.24E-01	6.37E-06	5.27E-02	1.12E 02	6.37E-06	1.12E-01	5.07E-02	1.12E 02
2.0E 00	1.13E-05	5.93E-07	1.15E-04	7.06E 01	1.24E-01	1.13E-05	5.87E-02	1.14E 02	1.13E-05	1.92E-01	5.87E-02	1.19E 02
3.0E 00	2.03E-05	1.33E-06	1.32E-04	6.11E 01	1.24E-01	2.03E-05	6.08E-02	1.27E 02	2.03E-05	1.93E-01	6.08E-02	1.27E 02
1.0E 01	9.03E-05	3.87E-06	2.53E-04	6.09E 01	2.87E-01	9.03E-05	9.33E-02	1.20E 02	9.03E-05	2.94E-01	9.33E-02	1.20E 02
2.0E 01	2.77E-04	1.34E-05	7.39E 01	9.03E-01	9.77E-05	1.95E-01	1.15E 02	9.77E-05	9.46E-01	1.95E-01	1.15E 02
3.0E 01	1.33E-03	3.87E-05	5.83E 01	2.09E 00	1.14E-03	2.69E-01	5.31E 01	1.33E-03	2.11E 00	2.69E-01	5.31E 01
4.0E 01	5.12E-03	1.03E-04	1.32E 01	9.01E 00	5.12E-03	2.74E-01	2.03E 01	5.12E-03	9.10E 00	2.73E-01	2.03E 01
5.0E 01	2.04E-02	6.33E-04	7.79E-01	4.75E 00	2.44E-02	2.77E-01	1.22E 01	2.44E-02	4.47E 00	2.77E-01	1.22E 01
6.0E 01	8.13E-02	2.53E-03	3.09E-02	1.93E 01	1.12E-01	2.78E-01	1.01E-01	1.12E-01	1.78E 01	2.78E-01	1.01E-01
7.0E 01	3.47E-01	9.42E-03	5.87E-04	3.00E 01	3.42E-01	2.54E-01	9.17E-02	3.42E-01	3.08E 01	2.69E-01	9.17E-02
8.0E 01	1.73E 00	3.73E-02	5.87E-04	1.27E 02	9.61E 00	2.29E-01	9.17E-02	9.61E 00	1.28E 02	2.29E-01	9.17E-02
9.0E 01	4.57E 00	9.57E-02	5.87E-04	1.09E 02	9.57E 00	1.86E-01	9.17E-02	9.57E 00	1.72E 02	1.86E-01	9.17E-02
1.0E 02	1.31E 01	1.33E-01	5.87E-04	1.03E 02	3.39E 01	9.99E-02	9.17E-02	3.39E 01	1.99E 02	9.57E-02	9.17E-02
1.1E 02	2.91E 01	8.30E-02	5.87E-04	2.72E 01	2.91E 01	1.40E-02	9.14E-02	2.91E 01	2.73E 01	1.40E-02	9.18E-02
1.2E 02	1.27E 03	9.33E-05	9.87E-04	1.31E-02	1.24E 03	1.33E-02	9.13E-02	6.29E 00	9.39E 00	1.40E-02	9.18E-02
1.3E 02	1.26E 03	3.93E-05	1.57E-18	1.29E-03	1.33E-02	9.28E-02	1.29E 03	1.91E-19	1.33E-02	9.28E-02

Table D4. Cont'd.

Curies Per Metric Ton of Heavy Metal Charged To Reactor

YEAR	RA-222	RA-223	RA-224	RA-225	RA-226	AC-225	AC-227	TH-227	TH-228	TH-229
1.02E 03	4.37E-05	1.12E-01	9.24E-04	3.07E-04	1.12E-02	1.12E-01	6.87E-06	4.09E-02	1.12E-01	3.07E-02	4.09E-02	3.03E-02
2.03 02	1.41E-05	1.36E-01	5.93E-04	3.87E-02	1.19E-02	1.32E-01	1.10E-03	4.55E-02	1.32E-01	3.85E-02	4.55E-02	3.41E-02
5.03 04	2.13E-05	1.63E-01	5.93E-04	6.03E-02	1.27E-02	1.43E-01	2.18E-05	5.73E-02	1.43E-01	6.07E-02	5.73E-02	5.99E-02
1.04 05	4.31E-05	2.04E-01	1.83E-03	9.33E-02	1.46E-02	1.49E-01	9.03E-05	7.13E-02	2.49E-01	9.31E-02	7.13E-02	9.20E-02
2.04 15	4.77E-05	2.03E-01	2.02E-03	1.03E-01	1.63E-02	9.49E-02	9.77E-05	8.40E-02	2.90E-01	1.09E-01	8.40E-02	1.03E-01
5.04 25	5.47E-05	2.11E-01	2.23E-03	1.29E-01	1.93E-01	1.10E-01	9.09E-04	9.14E-02	1.13E-01	2.28E-01	9.14E-02	2.25E-01
1.05 35	5.74E-05	2.21E-01	2.47E-03	1.84E-01	2.21E-02	1.39E-01	4.17E-02	2.11E-04	9.17E-02	2.66E-01	9.17E-02	2.66E-01
2.05 45	5.74E-05	2.21E-01	2.47E-03	2.77E-01	2.21E-02	1.39E-03	4.17E-02	6.13E-03	9.17E-02	2.75E-01	9.17E-02	2.75E-01
5.05 55	5.74E-05	2.21E-01	2.47E-03	4.77E-01	2.21E-02	1.39E-03	4.17E-02	2.97E-02	9.17E-02	2.77E-01	9.17E-02	2.73E-01
1.06 65	5.74E-05	2.21E-01	2.47E-03	6.78E-01	2.21E-02	1.39E-03	4.17E-02	1.12E-01	9.17E-02	1.96E-01	2.78E-01	9.17E-02	2.70E-01
2.06 75	5.74E-05	2.21E-01	2.47E-03	8.78E-01	2.21E-02	1.39E-03	4.17E-02	3.92E-01	9.17E-02	5.04E-01	2.84E-01	9.17E-02	2.65E-01
5.06 85	5.74E-05	2.21E-01	2.47E-03	1.03E 00	2.21E-02	1.39E-03	4.17E-02	7.30E-01	1.73E 00	9.17E-02	7.90E-01	2.93E-01	9.17E-02	2.64E-01
1.07 96	5.81E-05	2.24E-01	2.50E-03	2.22E-01	2.21E-02	1.40E-02	4.61E-03	9.17E-02	1.26E-02	2.49E-01	9.17E-02	2.26E-01
2.07 06	5.81E-05	2.24E-01	2.50E-03	1.00E-01	9.17E-02	1.72E-02	9.57E-03	9.17E-02	1.72E-02	1.08E-01	9.17E-02	1.05E-01
5.07 16	5.81E-05	2.24E-01	2.50E-03	1.03E-01	9.17E-02	1.79E-02	2.16E-01	9.17E-02	1.79E-02	1.08E-01	9.17E-02	1.08E-01
1.08 26	5.81E-05	2.24E-01	2.50E-03	9.58E-02	9.17E-02	1.95E-02	3.33E-01	9.17E-02	1.46E-02	9.29E-02	9.17E-02	9.53E-02
2.08 36	5.81E-05	2.24E-01	2.50E-03	1.46E-01	9.17E-02	2.78E-01	2.81E-01	9.13E-02	2.78E-01	1.46E-01	9.13E-02	1.44E-02
5.08 46	5.81E-05	2.24E-01	2.50E-03	1.46E-01	9.18E-02	9.58E-03	6.24E-03	9.13E-02	9.58E-03	1.46E-01	9.13E-02	1.44E-02
1.09 56	5.81E-05	7.49E-02	2.33E-03	1.46E-01	9.21E-02	7.49E-02	1.24E-03	9.21E-02	7.49E-02	1.46E-02	9.21E-02	1.43E-02
2.09 66	1.47E-03	1.61E-14	1.53E-03	1.73E-01	9.28E-02	1.61E-14	1.24E-03	9.28E-02	1.61E-14	1.33E-02	9.28E-02	1.31E-02

YEAR	TH-229	TH-230	TH-232	TH-231	TH-232	TH-234	PA-231	PA-233	PA-234M	PA-234	U-232	U-233
1.02 03	4.09E-02	1.12E-01	9.24E-04	3.07E-04	4.17E-02	1.12E-01	2.80E-01	1.03E 02	3.78E-03	3.81E-06	1.34E 02	2.13E 02
2.03 02	4.55E-02	1.32E-01	5.93E-04	3.87E-02	4.17E-02	1.22E-03	2.80E-01	1.03E 03	1.22E-03	1.22E-06	1.33E 02	2.13E 02
5.03 04	5.73E-02	1.43E-01	5.93E-04	6.03E-02	4.17E-02	1.22E-03	2.80E-01	1.79E 03	1.22E-03	1.22E-06	1.29E 02	2.13E 02
1.04 05	7.13E-02	2.49E-01	1.83E-03	9.33E-02	4.17E-02	1.22E-03	2.80E-01	1.79E 03	1.22E-03	1.22E-06	1.29E 02	2.13E 02
2.04 15	8.40E-02	2.90E-01	2.02E-03	1.03E-01	4.17E-02	1.22E-03	2.80E-01	1.79E 03	1.22E-03	1.22E-06	1.11E 02	2.13E 02
5.04 25	9.14E-02	1.13E-01	2.23E-03	1.29E-01	4.17E-02	1.22E-03	2.74E-01	1.80E 03	1.22E-03	1.22E-06	8.35E 01	2.13E 02
1.05 35	9.31E-02	2.11E-01	2.47E-03	1.84E-01	4.17E-02	1.22E-03	2.73E-01	1.80E 03	1.22E-03	1.22E-06	5.15E 01	2.13E 02
2.05 45	9.14E-02	9.13E-02	2.47E-03	2.77E-01	4.17E-02	1.22E-03	2.73E-01	1.81E 03	1.22E-03	1.22E-06	3.17E 01	2.13E 02
5.05 55	1.02E-01	4.47E 00	2.47E-03	4.77E-01	4.17E-02	1.22E-03	2.77E-01	1.84E 03	1.22E-03	1.22E-06	1.10E 00	2.13E 02
1.06 65	1.03E-01	1.96E 01	2.47E-03	6.78E-01	4.17E-02	1.22E-03	2.74E-01	1.85E 03	1.22E-03	1.22E-06	4.90E-03	2.12E 02
2.06 75	9.17E-02	5.03E 01	2.47E-03	8.78E-01	4.17E-02	1.22E-03	2.69E-01	1.88E 03	1.22E-03	1.22E-06	5.87E-07	2.12E 02
5.06 85	9.17E-02	7.49E 01	2.47E 00	1.03E 00	4.17E-02	1.22E-03	2.53E-01	1.88E 03	1.22E-03	1.22E-06	1.56E-14	2.09E 02
1.07 96	9.17E-02	1.49E 02	2.50E 00	1.96E-01	4.17E-02	1.22E-03	2.27E-01	1.88E 03	1.22E-03	1.22E-06	2.08E-03	2.04E 02
2.07 06	9.17E-02	1.49E 02	2.50E 00	1.00E-01	4.17E-02	1.22E-03	1.89E-01	1.87E 03	1.22E-03	1.22E-06	0.0	1.96E 02
5.07 16	9.17E-02	1.49E 02	2.50E 00	2.03E-01	4.17E-02	1.22E-03	1.08E-01	1.85E 03	1.22E-03	1.22E-06	0.0	1.73E 02
1.08 26	9.17E-02	1.49E 02	2.50E 00	9.58E-02	4.17E-02	1.22E-03	9.54E-02	1.87E 03	1.22E-03	1.22E-06	0.0	1.60E 02
2.08 36	9.13E-02	1.49E 02	2.50E 00	1.46E-01	4.18E-02	1.22E-03	1.46E-02	1.60E 03	1.24E-03	1.24E-06	0.0	2.66E 01
5.08 46	9.13E-02	1.49E 02	2.50E 00	1.46E-01	4.18E-02	1.22E-03	1.46E-02	1.36E 03	1.25E-03	1.25E-06	0.0	8.40E 00
1.09 56	9.21E-02	1.49E 02	2.50E 00	1.46E-01	4.21E-02	1.22E-03	1.46E-02	1.37E-02	1.25E-03	1.25E-06	0.0	1.98E-02
2.09 66	9.28E-02	1.49E 02	2.50E 00	1.33E-02	4.28E-02	1.22E-03	1.33E-02	1.01E-14	1.29E-03	1.29E-06	0.0	1.61E-14

Table D4. Cont'd.

Curies Per Metric Ton of Heavy Metal Charged To Reactor

YEAR	U-234	U-235	U-236	U-237	U-238	U-240	NP-237	NP-239	NP-240M	PU-236	PU-238	PU-239
1.0E 00	9.13E-01	1.49E-02	9.50E-01	2.82E-01	1.22E-03	6.07E-14	1.79E 00	8.12E 00	6.07E-14	5.32E-01	2.20E 04	1.73E 01
2.0E 00	9.13E-01	1.49E-02	9.50E-01	2.84E-01	1.22E-03	9.98E-14	1.79E 00	8.12E 00	9.98E-14	4.17E-01	2.18E 04	1.73E 01
5.0E 00	9.13E-01	1.49E-02	9.50E-01	2.83E-01	1.22E-03	1.97E-13	1.79E 00	8.12E 00	1.97E-13	2.91E-01	2.13E 04	1.73E 01
1.0E 01	9.13E-01	1.49E-02	9.50E-01	1.89E-01	1.22E-03	3.88E-13	1.79E 00	8.11E 00	3.88E-13	5.98E-02	2.05E 04	1.73E 01
2.0E 01	9.13E-01	1.49E-02	9.50E-01	1.19E-01	1.22E-03	7.09E-13	1.79E 00	8.11E 00	7.09E-13	5.49E-03	1.90E 04	1.73E 01
5.0E 01	9.13E-01	1.49E-02	9.50E-01	2.79E-02	1.22E-03	1.73E-12	1.80E 00	8.08E 00	1.73E-12	5.55E-06	1.50E 04	1.73E 01
1.0E 02	9.13E-01	1.49E-02	9.50E-01	2.58E-03	1.22E-03	3.99E-12	1.80E 00	8.05E 00	3.99E-12	1.80E-11	1.02E 04	1.73E 01
2.0E 02	9.13E-01	1.49E-02	9.50E-01	2.73E-03	1.22E-03	8.35E-12	1.81E 00	7.97E 00	8.85E-12	5.37E-12	4.67E 03	1.72E 01
5.0E 02	9.13E-01	1.49E-02	9.50E-01	5.96E-06	1.22E-03	1.71E-11	1.84E 00	7.76E 00	1.71E-11	1.03E-53	4.51E 02	1.72E 01
1.0E 03	9.13E-01	1.49E-02	9.51E-01	5.22E-06	1.22E-03	3.41E-11	1.86E 00	7.49E 00	3.41E-11	0.0	9.23E 00	1.70E 01
2.0E 03	9.13E-01	1.49E-02	9.52E-01	4.80E-06	1.22E-03	6.81E-11	1.88E 00	6.77E 00	6.81E-11	0.0	3.93E-03	1.68E 01
5.0E 03	9.13E-01	1.49E-02	9.54E-01	3.73E-06	1.22E-03	1.70E-10	1.88E 00	5.10E 00	1.70E-10	0.0	6.10E-11	1.59E 01
1.0E 04	9.13E-01	1.49E-02	9.57E-01	2.45E-06	1.22E-03	3.40E-10	1.88E 00	3.23E 00	3.38E-10	0.0	7.61E-21	1.43E 01
2.0E 04	9.13E-01	1.49E-02	9.59E-01	1.08E-06	1.22E-03	6.67E-10	1.87E 00	1.33E 00	6.65E-10	0.0	2.74E-40	1.13E 01
5.0E 04	9.13E-01	1.49E-02	9.73E-01	6.57E-08	1.22E-03	1.62E-09	1.85E 00	8.75E-02	1.62E-09	0.0	0.0	5.03E 00
1.0E 05	9.12E-01	1.49E-02	9.59E-01	1.29E-09	1.22E-03	3.10E-09	1.82E 00	9.93E-06	3.10E-09	0.0	0.0	1.22E 00
5.0E 05	1.73E-01	1.49E-02	9.57E-01	3.40E-24	1.24E-03	1.06E-08	1.60E 00	7.40E-07	1.06E-08	0.0	0.0	1.49E-05
1.0E 06	4.16E-03	1.49E-02	9.49E-01	2.13E-42	1.26E-03	1.49E-08	1.36E 00	7.24E-07	1.48E-08	0.0	0.0	6.66E-07
1.5E 07	1.25E-03	1.49E-02	7.27E-01	0.0	1.26E-03	1.50E-08	7.37E-02	4.95E-07	1.60E-08	0.0	0.0	4.95E-07
1.0E 08	1.24E-03	1.33E-02	5.36E-02	0.0	1.24E-03	7.53E-09	1.61E-14	1.10E-08	7.53E-09	0.0	0.0	1.10E-08

YEAR	PU-240	PU-241	PU-242	PU-243	PU-244	AM-241	AM-242M	AM-242	AM-243	AM-244	AM-245	CM-242
1.0E 00	3.58E-01	1.17E 04	4.53E-01	7.55E-08	5.06E-14	3.96E 01	5.66E-01	5.66E-01	8.12E 00	7.91E-17	1.11E-07	5.15E 02
2.0E 00	3.60E-01	1.14E 04	4.53E-01	7.55E-07	9.99E-14	3.80E 01	5.63E-01	5.63E-01	8.12E 00	1.23E-16	4.94E-08	1.09E 02
5.0E 00	3.69E-01	9.70E 03	4.53E-01	7.55E-07	1.97E-13	1.08E 02	5.55E-01	5.55E-01	8.12E 00	2.57E-16	4.40E-09	1.49E 00
1.0E 01	3.71E-01	7.55E 03	4.53E-01	7.55E-07	3.68E-13	1.70E 02	5.43E-01	5.43E-01	8.11E 00	4.79E-16	7.80E-11	4.47E-01
2.0E 01	3.82E-01	4.70E 03	4.53E-01	7.55E-07	1.10E-12	2.70E 02	5.19E-01	5.19E-01	8.11E 00	9.23E-16	2.46E-14	4.26E-01
5.0E 01	3.96E-01	1.63E 03	4.53E-01	7.55E-07	6.73E-12	3.79E 02	4.93E-01	4.93E-01	8.08E 00	2.26E-15	7.67E-25	3.71E-01
1.0E 02	4.00E-01	1.37E 02	4.53E-01	7.55E-07	3.99E-12	3.30E 02	3.50E-01	3.60E-01	8.05E 00	4.49E-15	2.37E-42	2.95E-01
2.0E 02	3.47E-01	1.10E 00	4.53E-01	7.55E-07	2.80E-12	3.27E 02	2.20E-01	2.29E-01	7.97E 00	8.92E-15	0.0	1.87E-01
5.0E 02	1.95E-01	2.27E-01	4.53E-01	7.55E-07	1.71E-11	2.02E 02	5.81E-02	5.81E-02	7.76E 00	2.22E-14	0.0	4.77E-02
1.0E 03	3.66E-01	2.17E-01	4.53E-01	7.55E-07	3.42E-11	9.39E 01	5.93E-03	5.95E-03	7.42E 00	4.44E-14	0.0	4.88E-03
2.0E 03	3.83E-01	2.30E-01	4.57E-01	7.55E-07	6.82E-11	1.45E 01	6.22E-05	6.22E-05	6.77E 00	8.87E-14	0.0	5.10E-05
5.0E 03	2.43E-01	1.55E-01	4.93E-01	7.55E-07	1.70E-10	3.42E-01	7.11E-11	7.11E-11	5.16E 00	2.21E-13	0.0	5.83E-11
1.0E 04	1.45E-01	1.02E-01	5.91E-01	7.55E-07	3.38E-10	1.17E-01	5.83E-21	5.91E-21	3.28E 00	4.40E-13	0.0	7.30E-21
2.0E 04	5.22E 00	9.42E-02	9.44E-01	7.55E-07	6.70E-10	9.42E-02	1.33E-40	1.38E-40	1.33E 00	8.71E-13	0.0	1.13E-40
5.0E 04	2.40E-01	3.37E-03	4.20E-01	7.54E-07	1.63E-09	3.37E-03	0.0	0.0	8.75E-02	2.11E-12	0.0	0.0
1.0E 05	1.43E-03	3.83E-05	3.83E-01	7.52E-07	3.10E-09	5.39E-05	0.0	0.0	9.43E-04	4.03E-12	0.0	0.0
5.0E 05	1.03E-03	1.45E-14	1.84E-01	7.40E-07	1.06E-08	1.53E-14	0.0	0.0	7.40E-07	1.41E-11	0.0	0.0
1.0E 06	1.40E-03	3.37E-38	7.39E-02	7.24E-07	1.48E-08	9.30E-38	0.0	0.0	7.24E-07	1.93E-11	0.0	0.0
1.5E 07	1.60E-03	0.0	5.24E-04	4.93E-07	1.60E-08	0.0	0.0	0.0	4.95E-07	2.06E-11	0.0	0.0
1.0E 08	7.53E-04	0.0	0.0	1.10E-08	7.53E-09	0.0	0.0	0.0	1.10E-08	9.81E-12	0.0	0.0

Curies Per Metric Ton of Heavy Metal Charged To Reactor

YEAR	CM-243	CM-244	CM-245	CM-246	CM-247	CM-248	CM-249	CM-250	BK-249	BK-250	CF-249	CF-250
1.0E 00	0.0	0.0	0.0	0.0	0.0	0.0	1.79E-15	1.91E-12	7.38E-03	1.91E-12	0.0	0.0
2.0E 00	0.0	0.0	0.0	0.0	0.0	0.0	1.23E-21	1.91E-12	3.29E-03	1.91E-12	0.0	0.0
5.0E 00	0.0	0.0	0.0	0.0	0.0	0.0	3.61E-40	1.91E-12	2.93E-06	1.91E-12	0.0	0.0
1.0E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.91E-12	9.20E-06	1.91E-12	0.0	0.0
2.0E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.91E-12	1.04E-09	1.91E-12	0.0	0.0
5.0E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.81E-12	5.11E-20	1.91E-12	0.0	0.0
1.0E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.91E-12	1.58E-37	1.91E-12	0.0	0.0
2.0E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.90E-12	0.0	1.90E-12	0.0	0.0
5.0E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.88E-12	0.0	1.88E-12	0.0	0.0
1.0E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.84E-12	0.0	1.84E-12	0.0	0.0
2.0E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.77E-12	0.0	1.77E-12	0.0	0.0
5.0E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.57E-12	0.0	1.57E-12	0.0	0.0
1.0E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.28E-12	0.0	1.28E-12	0.0	0.0
2.0E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.63E-13	0.0	8.63E-13	0.0	0.0
5.0E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.61E-13	0.0	2.61E-13	0.0	0.0
1.0E 05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.50E-14	0.0	3.50E-14	0.0	3.50E-14
5.0E 05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.28E-21	0.0	6.28E-21	0.0	6.28E-21
1.0E 06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.21E-29	0.0	1.21E-29
1.0E 07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.0E 08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

YEAR	CF-251	CF-252	CF-253	CF-254	ES-253
1.0E 00	0.0	0.0	0.0	0.0	0.0
2.0E 00	0.0	0.0	0.0	0.0	0.0
5.0E 00	0.0	0.0	0.0	0.0	0.0
1.0E 01	0.0	0.0	0.0	0.0	0.0
2.0E 01	0.0	0.0	0.0	0.0	0.0
5.0E 01	0.0	0.0	0.0	0.0	0.0
1.0E 02	0.0	0.0	0.0	0.0	0.0
2.0E 02	0.0	0.0	0.0	0.0	0.0
5.0E 02	0.0	0.0	0.0	0.0	0.0
1.0E 03	0.0	0.0	0.0	0.0	0.0
2.0E 03	0.0	0.0	0.0	0.0	0.0
5.0E 03	0.0	0.0	0.0	0.0	0.0
1.0E 04	0.0	0.0	0.0	0.0	0.0
2.0E 04	0.0	0.0	0.0	0.0	0.0
5.0E 04	0.0	0.0	0.0	0.0	0.0
1.0E 05	0.0	0.0	0.0	0.0	0.0
5.0E 05	0.0	0.0	0.0	0.0	0.0
1.0E 06	0.0	0.0	0.0	0.0	0.0
1.0E 07	0.0	0.0	0.0	0.0	0.0
1.0E 08	0.0	0.0	0.0	0.0	0.0

Table D5. Significant Actinide Activity From HTGR Equilibrium Fuel Cycle - High Level Waste

Curies Per Kilogram of Actinides In High Level Waste

Years	Th-227	Th-228	Th-229	Pa-229	Pa-230	Pa-231	Pa-232	Pa-233	U-230	U-231	U-232	U-233
1.0E 00	2.25E-03	3.33E-02	1.68E-06	3.52E-05	3.93E-08	2.26E-03	8.32E-02	9.40E-07	3.53E-08	2.26E-03	8.32E-02	8.55E-05
2.0E 00	2.84E-03	3.14E-02	2.29E-06	1.30E-04	4.85E-08	2.85E-03	8.87E-02	9.42E-07	4.85E-08	2.85E-03	8.87E-02	1.04E-04
5.0E 00	4.40E-03	3.99E-02	3.68E-06	1.52E-04	8.20E-08	4.47E-03	9.55E-02	9.48E-07	8.59E-08	4.47E-03	9.55E-02	1.38E-04
1.0E 01	6.86E-03	3.92E-02	5.67E-06	2.99E-04	1.92E-07	6.86E-03	9.53E-02	9.65E-07	1.92E-07	6.86E-03	9.50E-02	2.49E-04
2.0E 01	1.08E-02	3.11E-02	9.69E-06	6.32E-04	4.91E-07	1.08E-02	8.84E-02	9.24E-07	2.91E-07	1.08E-02	8.66E-02	6.30E-04
5.0E 01	1.07E-02	2.32E-02	2.14E-05	9.72E-04	3.77E-07	1.05E-02	6.44E-02	1.05E-06	5.77E-07	1.06E-02	6.46E-02	9.72E-04
1.0E 02	1.48E-02	1.48E-02	4.12E-05	1.68E-03	2.46E-06	1.49E-02	3.99E-02	3.77E-06	2.11E-06	1.49E-02	3.99E-02	1.87E-03
2.0E 02	2.09E-02	9.99E-03	8.05E-05	3.00E-03	6.33E-05	2.03E-02	1.52E-02	1.49E-05	1.39E-05	2.05E-02	1.52E-02	3.66E-03
5.0E 02	2.03E-02	3.23E-03	1.90E-04	4.92E-03	1.57E-04	2.06E-02	9.13E-04	1.80E-04	1.57E-04	2.06E-02	9.13E-04	8.92E-03
1.0E 03	2.03E-02	2.07E-03	3.42E-04	1.73E-02	7.78E-04	2.03E-02	7.43E-05	8.27E-04	7.76E-04	2.03E-02	7.43E-05	1.73E-02
2.0E 03	1.97E-02	2.03E-03	8.27E-04	3.30E-02	3.04E-03	1.97E-02	6.75E-05	3.24E-03	3.24E-03	1.97E-02	6.75E-05	3.30E-02
5.0E 03	1.89E-02	2.03E-03	1.94E-03	7.62E-02	1.93E-02	1.83E-02	6.75E-05	1.53E-02	1.53E-02	1.85E-02	6.75E-05	1.20E-02
1.0E 04	1.86E-02	2.03E-03	2.56E-03	1.10E-01	3.93E-02	1.80E-02	6.75E-05	3.98E-02	3.98E-02	1.86E-02	6.75E-05	1.10E-01
2.0E 04	1.39E-02	2.03E-03	3.52E-03	1.06E-01	3.73E-02	1.33E-02	6.75E-05	8.73E-02	8.73E-02	1.39E-02	6.75E-05	1.06E-01
5.0E 04	7.03E-03	2.03E-03	4.98E-03	1.81E-01	1.49E-01	7.11E-03	6.75E-05	1.94E-01	1.94E-01	7.11E-03	6.75E-05	1.81E-01
1.0E 05	2.47E-03	2.03E-03	3.82E-03	1.76E-01	2.13E-01	2.48E-03	6.75E-05	3.10E-01	3.10E-01	2.48E-03	6.75E-05	1.76E-01
2.0E 05	1.07E-03	2.03E-03	2.03E-03	1.93E-01	2.20E-01	6.07E-04	6.75E-05	2.22E-01	2.22E-01	6.07E-04	6.75E-05	1.93E-01
5.0E 05	6.32E-05	2.03E-03	1.97E-03	1.12E-01	9.73E-02	6.33E-05	6.75E-05	5.70E-02	5.70E-02	6.03E-05	6.75E-05	1.12E-01
1.0E 06	5.99E-03	2.03E-03	1.24E-03	3.87E-03	3.86E-03	5.99E-05	6.81E-05	3.86E-06	3.86E-06	5.98E-05	6.81E-05	5.87E-03
2.0E 06	5.90E-03	2.03E-03	1.24E-03	3.87E-03	3.86E-03	5.90E-05	6.96E-05	3.86E-06	3.86E-06	5.90E-05	6.96E-05	1.18E-15

Years	Bi-214	Po-214	Pb-211	Pb-214	Pu-239	Pu-240	Pu-241	Pu-242	Pu-236	Po-210	Am-241	Np-237	Ra-226
1.0E 00	6.93E-07	2.79E-06	6.78E-06	5.93E-02	3.37E-05	4.90E-07	2.26E-03	8.32E-02	4.90E-07	8.55E-05	2.26E-03	8.32E-02
2.0E 00	9.92E-07	9.97E-06	8.59E-06	5.06E-02	1.31E-04	9.92E-07	2.85E-03	8.87E-02	9.92E-07	1.09E-06	2.85E-03	8.87E-02
5.0E 00	9.98E-07	7.43E-06	1.34E-05	6.11E-02	1.33E-04	9.98E-07	4.47E-03	9.55E-02	9.98E-07	1.38E-06	4.47E-03	9.55E-02
1.0E 01	9.85E-07	1.35E-05	2.30E-05	6.08E-02	2.93E-04	9.15E-07	6.86E-03	9.50E-02	9.85E-07	2.49E-06	6.86E-03	9.50E-02
2.0E 01	9.29E-07	2.91E-05	3.19E-05	5.93E-02	9.20E-04	9.29E-07	5.24E-07	1.06E-02	9.24E-07	4.30E-06	1.06E-02	8.89E-04
5.0E 01	1.05E-06	9.77E-07	5.03E-05	9.12E-02	9.50E-04	1.05E-06	1.68E-02	6.44E-02	1.05E-06	9.72E-06	1.68E-02	6.44E-02
1.0E 02	3.77E-06	2.17E-06	5.94E-05	2.52E-02	1.83E-03	3.77E-06	1.93E-02	3.98E-02	3.77E-06	1.87E-05	1.98E-02	3.98E-02
2.0E 02	1.99E-05	1.39E-05	6.14E-05	4.70E-03	3.58E-03	1.98E-05	2.05E-02	1.52E-02	1.98E-05	3.66E-03	2.05E-02	1.52E-02
5.0E 02	1.80E-04	1.57E-04	6.11E-05	5.66E-04	9.72E-03	1.79E-04	2.04E-02	9.13E-04	1.80E-04	8.92E-03	2.04E-02	9.13E-04
1.0E 03	8.27E-04	7.75E-04	6.04E-05	4.75E-05	1.73E-02	8.27E-04	2.01E-02	7.43E-05	8.27E-04	1.73E-02	2.01E-02	7.43E-05
2.0E 03	3.29E-03	3.29E-03	5.92E-05	4.92E-05	2.23E-02	3.29E-03	1.97E-02	6.75E-05	3.24E-03	3.30E-02	1.97E-02	6.75E-05
5.0E 03	1.53E-02	1.53E-02	5.55E-05	4.32E-05	7.09E-02	1.53E-02	1.85E-02	6.75E-05	1.53E-02	7.20E-02	1.85E-02	6.75E-05
1.0E 04	3.98E-02	3.98E-02	4.44E-05	4.32E-05	1.19E-01	3.98E-02	1.66E-02	6.75E-05	3.98E-02	1.10E-01	1.66E-02	6.75E-05
2.0E 04	8.73E-02	8.73E-02	4.33E-05	4.32E-05	1.50E-01	8.73E-02	1.34E-02	6.75E-05	8.73E-02	1.80E-01	1.34E-02	6.75E-05
5.0E 04	1.94E-01	1.94E-01	4.13E-05	4.32E-05	1.77E-01	1.49E-01	7.11E-03	6.75E-05	1.99E-01	1.81E-01	7.11E-03	6.75E-05
1.0E 05	3.10E-01	3.10E-01	7.45E-06	4.32E-05	1.77E-01	3.10E-01	2.48E-03	6.75E-05	3.10E-01	1.76E-01	2.48E-03	6.75E-05
2.0E 05	2.22E-01	2.22E-01	1.83E-07	4.32E-05	1.33E-01	2.22E-01	6.09E-05	6.75E-05	2.23E-01	1.36E-01	6.09E-05	6.75E-05
5.0E 05	5.70E-02	5.70E-02	1.91E-07	4.32E-05	1.13E-01	5.70E-02	6.03E-05	6.75E-05	5.70E-02	1.12E-01	6.03E-05	6.75E-05
1.0E 06	3.84E-06	3.84E-06	1.74E-07	4.30E-05	9.73E-03	3.84E-06	5.94E-05	6.81E-05	3.84E-06	5.87E-03	5.94E-05	6.81E-05
2.0E 06	3.84E-06	3.84E-06	1.84E-07	4.65E-05	1.13E-15	3.84E-06	5.94E-05	6.96E-05	3.84E-06	1.18E-15	5.94E-05	6.96E-05

Table D5. Cont'd.

Curies Per Kilogram of Actinides In High Level Waste

Year	AC-227	AC-228	TH-227
1.0E 00	8.55E-05	2.23E-03	2.23E-03
2.0E 00	1.06E-04	2.63E-03	2.10E-03
5.0E 00	1.56E-03	1.56E-03	6.41E-03
1.0E 01	9.56E-04	9.56E-04	6.77E-03
2.0E 01	3.82E-04	3.82E-04	1.05E-02
5.0E 01	9.72E-04	1.64E-02	1.65E-02
1.0E 02	6.75E-05	1.49E-02	1.49E-02
2.0E 02	6.75E-05	2.02E-02	2.02E-02
5.0E 02	6.75E-05	2.02E-02	2.01E-02
1.0E 03	6.75E-05	1.99E-02	1.99E-02
2.0E 03	6.75E-05	1.99E-02	1.99E-02
5.0E 03	6.75E-05	1.82E-02	1.82E-02
1.0E 04	6.75E-05	1.66E-02	1.66E-02
2.0E 04	6.75E-05	1.32E-02	1.32E-02
5.0E 04	6.75E-05	6.63E-03	6.63E-03
1.0E 05	6.75E-05	6.75E-05	6.75E-05
2.0E 05	6.75E-05	6.63E-03	6.63E-03
5.0E 05	6.75E-05	6.63E-03	6.63E-03
1.0E 06	6.75E-05	6.75E-05	6.75E-05
1.0E 07	6.81E-05	5.90E-03	5.90E-03
1.0E 08	1.14E-15	5.90E-03	5.90E-03

Year	TH-229	TH-230	TH-231	TH-232	TH-234	PA-231	PA-233	PA-233M	PA-234	U-232	U-233
1.0E 00	8.63E-02	8.55E-05	9.63E-06	1.03E-03	0.00E+00	2.73E-06	2.06E-02	7.57E-03	2.78E-06	2.80E-04	4.93E-02	1.91E-01
2.0E 00	8.93E-02	1.06E-04	9.75E-06	1.03E-03	0.00E+00	6.93E-07	2.06E-02	1.32E-01	6.93E-07	6.93E-10	9.82E-02	1.91E-01
5.0E 00	9.52E-02	1.56E-03	6.63E-05	1.03E-03	0.00E+00	6.95E-07	2.06E-02	1.32E-01	6.95E-07	6.95E-10	9.60E-02	1.91E-01
1.0E 01	9.56E-02	9.56E-04	9.72E-06	1.03E-03	0.00E+00	6.95E-07	2.06E-02	1.32E-01	6.95E-07	6.95E-10	9.19E-02	1.91E-01
2.0E 01	8.84E-02	3.82E-04	1.39E-05	1.03E-03	0.00E+00	6.95E-07	2.06E-02	1.32E-01	6.95E-07	6.93E-10	8.33E-02	1.91E-01
5.0E 01	8.99E-02	1.64E-02	2.78E-05	1.03E-03	0.00E+00	6.95E-07	2.06E-02	1.32E-01	6.95E-07	6.93E-10	6.26E-02	1.91E-01
1.0E 02	6.94E-02	1.49E-02	5.56E-05	1.03E-03	0.00E+00	6.95E-07	2.05E-02	1.32E-01	6.95E-07	6.93E-10	5.87E-02	1.91E-01
2.0E 02	1.39E-02	1.99E-02	1.11E-04	1.03E-03	0.00E+00	6.95E-07	2.05E-02	1.33E-01	6.95E-07	6.93E-10	1.49E-02	1.91E-01
5.0E 02	3.47E-03	1.82E-02	2.78E-04	1.03E-03	0.00E+00	6.97E-07	2.05E-02	1.33E-01	6.97E-07	6.97E-10	8.23E-06	1.91E-01
1.0E 03	1.74E-03	1.66E-02	5.56E-04	1.03E-03	0.00E+00	6.97E-07	2.03E-02	1.17E-01	9.00E-07	9.00E-10	8.83E-06	1.91E-01
2.0E 03	8.71E-04	1.32E-02	1.11E-03	1.27E-03	0.00E+00	9.03E-07	1.49E-02	1.58E-01	9.05E-07	9.05E-10	6.90E-10	1.90E-01
5.0E 03	6.97E-05	6.63E-03	1.04E-02	1.62E-03	0.00E+00	9.21E-07	1.85E-02	1.88E-01	9.21E-07	9.21E-10	1.20E-22	1.90E-01
1.0E 04	6.97E-05	1.66E-02	5.12E-02	2.10E-03	0.00E+00	9.90E-07	1.50E-02	1.58E-01	9.90E-07	9.90E-10	1.50E-41	1.89E-01
2.0E 04	6.97E-05	1.65E-02	9.73E-02	3.03E-03	0.00E+00	9.97E-07	1.39E-02	1.57E-01	9.97E-07	9.97E-10	0.0	1.47E-01
5.0E 04	6.97E-05	1.61E-02	2.00E-01	6.75E-03	0.00E+00	1.14E-06	7.13E-03	1.36E-01	1.14E-06	1.14E-09	0.0	1.41E-01
1.0E 05	6.75E-05	1.49E-02	3.61E-01	9.73E-03	0.00E+00	1.37E-06	2.93E-03	1.34E-01	1.37E-06	1.37E-09	0.0	1.7E-01
5.0E 05	6.75E-05	1.32E-02	2.19E-01	6.75E-03	0.00E+00	2.03E-06	6.05E-05	1.18E-01	2.03E-06	2.03E-09	0.0	1.32E-01
1.0E 06	6.75E-05	6.63E-03	1.09E-01	3.38E-03	0.00E+00	3.23E-06	6.03E-05	1.03E-01	3.23E-06	3.23E-09	0.0	1.22E-01
1.0E 07	6.81E-05	5.90E-03	1.09E-06	5.90E-03	0.00E+00	3.73E-06	5.49E-05	5.42E-03	3.73E-06	3.73E-09	0.0	5.97E-03
1.0E 08	6.48E-05	1.14E-15	3.64E-06	5.90E-03	0.00E+00	3.86E-06	5.49E-05	1.14E-15	3.86E-06	3.86E-09	0.0	1.14E-15

Table D5. Cont'd.

Curies Per Kilogram of Actinides In High Level Waste

Years	U-234	U-235	U-236	U-237	U-238	U-240	NP-237	NP-239	NP-240M	PU-236	PU-238	PU-239
1.0E 00	9.49E-02	1.33E-05	7.30E-06	2.07E-02	8.93E-07	6.97E-15	1.82E-01	5.97E-01	6.97E-15	3.91E-02	1.52E 03	1.27E 00
2.0E 00	9.49E-02	1.33E-05	7.30E-06	1.93E-02	8.93E-07	6.97E-15	1.82E-01	5.97E-01	6.97E-15	3.97E-02	1.61E 03	1.27E 00
5.0E 00	9.49E-02	1.33E-05	7.30E-06	1.76E-02	8.93E-07	1.45E-14	1.82E-01	5.97E-01	1.45E-14	4.06E-02	1.57E 03	1.27E 00
1.0E 01	9.49E-02	1.33E-05	7.30E-06	1.63E-02	8.93E-07	2.73E-14	1.82E-01	5.97E-01	2.73E-14	4.18E-02	1.51E 03	1.27E 00
2.0E 01	1.36E-01	1.90E-05	7.07E-06	8.41E-03	8.93E-07	5.21E-14	1.82E-01	5.96E-01	5.21E-14	3.85E-06	1.40E 03	1.27E 00
5.0E 01	2.29E-01	3.19E-05	6.53E-06	2.05E-03	8.93E-07	1.27E-13	1.82E-01	5.96E-01	1.27E-13	2.06E-07	1.13E 03	1.27E 00
1.0E 02	3.63E-01	5.06E-05	6.14E-06	1.84E-03	8.93E-07	2.53E-13	1.82E-01	5.96E-01	2.53E-13	1.30E-12	7.48E 02	1.27E 00
2.0E 02	5.40E-01	7.53E-05	5.76E-06	2.06E-03	8.93E-07	5.06E-13	1.82E-01	5.96E-01	5.06E-13	3.73E-23	3.43E 02	1.27E 00
5.0E 02	6.62E-01	1.00E-04	5.39E-06	2.40E-03	8.93E-07	1.26E-12	1.82E-01	5.71E-01	1.26E-12	7.03E-55	3.32E 01	1.26E 00
1.0E 03	8.56E-01	1.21E-04	5.03E-06	3.89E-03	8.93E-07	2.51E-12	1.82E-01	5.45E-01	2.51E-12	0.0	6.70E-01	1.25E 00
2.0E 03	8.56E-01	1.21E-04	4.69E-06	6.92E-03	8.93E-07	5.01E-12	1.82E-01	5.19E-01	5.01E-12	0.0	2.87E-04	1.23E 00
5.0E 03	8.56E-01	1.21E-04	3.96E-06	2.79E-02	8.93E-07	1.25E-11	1.82E-01	4.79E-01	1.25E-11	0.0	4.49E-12	1.17E 00
1.0E 04	8.56E-01	1.21E-04	3.23E-06	1.05E-01	8.93E-07	2.49E-11	1.82E-01	4.41E-01	2.49E-11	0.0	5.54E-22	1.09E 00
2.0E 04	8.56E-01	1.21E-04	2.49E-06	3.95E-01	8.93E-07	4.97E-11	1.82E-01	4.05E-01	4.97E-11	0.0	2.01E-91	8.30E-01
5.0E 04	8.56E-01	1.21E-04	1.50E-06	1.48E 00	8.93E-07	1.24E-10	1.82E-01	3.46E-01	1.24E-10	0.0	0.0	5.70E-01
1.0E 05	8.56E-01	1.21E-04	8.52E-07	5.55E 00	8.93E-07	2.48E-10	1.82E-01	2.99E-01	2.48E-10	0.0	0.0	4.01E-02
2.0E 05	8.56E-01	1.21E-04	2.70E-07	2.08E 01	8.93E-07	4.96E-10	1.82E-01	2.06E-01	4.96E-10	0.0	0.0	1.13E-06
5.0E 05	8.56E-01	1.21E-04	1.50E-08	1.52E-03	3.26E-	1.09E-09	1.80E-01	5.33E-03	1.09E-09	0.0	0.0	4.90E-09
1.0E 06	8.56E-01	1.21E-04	0.0	0.0	3.73E-06	5.46E-09	5.42E-03	3.66E-06	1.13E-09	0.0	0.0	3.64E-08
2.0E 06	8.56E-01	1.21E-04	8.52E-05	0.0	3.08E-06	5.46E-10	1.14E-15	8.11E-13	5.54E-10	0.0	0.0	8.11E-10

Years	PU-240	PU-241	PU-242	PU-243	PU-244	AM-241	AM-242M	AM-242	AM-243	AM-244	AM-245	CM-242
1.0E 00	2.06E 00	3.02E 02	3.37E-02	5.53E-08	9.47E-15	2.42E 00	4.10E-02	4.10E-02	5.97E-01	3.01E-10	8.14E-04	3.79E 01
2.0E 00	2.06E 00	3.02E 02	3.37E-02	5.55E-08	9.43E-15	9.27E 00	4.10E-02	4.10E-02	5.97E-01	9.07E-10	3.63E-09	8.06E 00
5.0E 00	2.06E 00	3.01E 02	3.37E-02	5.55E-08	1.03E-14	7.92E 00	4.09E-02	4.09E-02	5.97E-01	1.04E-17	3.23E-10	1.09E-01
1.0E 01	2.73E 00	3.02E 02	3.37E-02	5.55E-08	2.71E-14	1.29E 01	3.99E-02	3.99E-02	5.97E-01	4.32E-17	5.74E-12	3.22E-02
2.0E 01	2.68E 00	3.03E 02	3.37E-02	5.55E-08	5.22E-14	1.68E 01	3.82E-02	3.82E-02	5.96E-01	8.74E-17	1.81E-15	3.13E-02
5.0E 01	2.41E 00	3.02E 02	3.37E-02	5.55E-08	1.28E-13	2.70E 01	3.33E-02	3.33E-02	5.94E-01	1.50E-16	5.56E-20	2.73E-02
1.0E 02	2.04E 00	7.55E 00	3.37E-02	5.55E-08	2.53E-13	2.79E 01	2.60E-02	2.60E-02	5.92E-01	3.29E-16	1.74E-13	2.17E-02
2.0E 02	2.02E 00	3.93E-02	3.37E-02	5.55E-08	5.04E-13	2.69E 01	1.68E-02	1.68E-02	5.80E-01	6.53E-16	0.0	1.38E-02
5.0E 02	2.03E 00	1.67E-02	3.37E-02	5.55E-08	1.25E-12	1.99E 01	4.24E-03	4.24E-03	5.71E-01	1.60E-15	0.0	3.51E-03
1.0E 03	2.06E 00	1.52E-02	3.37E-02	5.55E-08	2.51E-12	6.08E 00	4.37E-04	4.37E-04	5.45E-01	3.27E-15	0.0	3.58E-04
2.0E 03	2.09E 00	1.47E-02	3.36E-02	5.55E-08	5.02E-12	1.09E 00	4.57E-06	4.57E-06	4.96E-01	6.52E-15	0.0	3.75E-06
5.0E 03	1.78E 00	1.19E-02	3.35E-02	5.55E-08	1.25E-11	2.27E-02	5.23E-12	5.23E-12	3.80E-01	1.63E-14	0.0	4.29E-12
1.0E 04	1.07E 00	7.52E-03	3.32E-02	5.55E-08	2.49E-11	7.09E-03	6.93E-22	6.93E-22	2.05E-01	3.23E-14	0.0	5.37E-22
2.0E 04	3.83E-01	3.23E-03	3.29E-02	5.55E-08	4.97E-11	3.25E-03	1.01E-91	1.01E-91	9.75E-02	6.41E-14	0.0	6.39E-92
5.0E 04	1.77E-02	2.65E-04	3.03E-02	5.54E-08	1.23E-10	2.60E-04	0.0	0.0	6.49E-03	1.33E-13	0.0	0.0
1.0E 05	1.63E-04	3.90E-05	2.92E-02	5.51E-08	2.42E-10	3.90E-06	0.0	0.0	6.95E-05	2.90E-13	0.0	0.0
5.0E 05	1.97E-10	1.33E-20	1.30E-02	5.44E-08	1.97E-10	1.12E-20	0.0	0.0	5.66E-03	1.09E-12	0.0	0.0
1.0E 06	1.03E-13	0.0	3.43E-03	5.32E-08	1.03E-09	6.38E-39	0.0	0.0	2.31E-03	1.42E-12	0.0	0.0
2.0E 06	1.10E-04	0.0	3.09E-10	5.09E-08	1.10E-09	0.0	0.0	0.0	5.66E-08	1.33E-12	0.0	0.0
5.0E 06	5.55E-10	0.0	0.0	4.11E-10	5.55E-10	0.0	0.0	0.0	8.11E-10	7.21E-13	0.0	0.0

Table D6. Cont'd.

Curies Per Kilogram of Actinides In High Level Waste

YEAR	CM-243	CM-244	CM-245	CM-246	CM-247	CM-248	CM-249	CM-250	BK-249	BK-250	CF-249	CF-250
1.0E 00	7.33E-02	1.03E 02	1.78E-02	1.03E-02	5.55E-08	5.27E-07	1.92E-10	1.41E-13	5.42E-06	1.41E-13	3.27E-06	2.81E-05
2.0E 00	7.17E-02	1.05E 02	1.78E-02	1.03E-02	5.55E-08	5.27E-07	8.89E-23	1.41E-13	2.42E-04	1.41E-13	3.99E-06	2.66E-05
5.0E 00	7.27E-02	1.01E 02	1.73E-02	1.03E-02	5.55E-08	5.27E-07	2.55E-61	1.41E-13	2.15E-05	1.41E-13	4.50E-06	2.27E-05
1.0E 01	5.03E-02	9.61E 01	1.73E-02	1.03E-02	5.55E-08	5.27E-07	0.0	1.41E-13	3.82E-07	1.41E-13	4.51E-06	1.76E-05
2.0E 01	4.55E-02	8.23E 01	1.73E-02	1.03E-02	5.55E-08	5.27E-07	0.0	1.41E-13	1.23E-10	1.41E-13	4.42E-06	1.03E-05
5.0E 01	2.65E-02	1.49E 01	1.73E-02	1.03E-02	5.55E-08	5.27E-07	0.0	1.41E-13	1.78E-21	1.41E-13	4.17E-06	2.09E-06
1.0E 02	9.39E-03	2.49E 00	1.72E-02	1.03E-02	5.55E-08	5.27E-07	0.0	1.41E-13	1.10E-34	1.41E-13	3.78E-06	1.44E-07
2.0E 02	4.48E-04	6.37E-02	1.71E-02	1.02E-02	5.55E-08	5.27E-07	0.0	1.40E-13	0.0	1.40E-13	3.13E-06	7.19E-10
5.0E 02	1.44E-05	6.01E-07	1.56E-02	9.78E-03	5.55E-08	5.27E-07	0.0	1.38E-13	0.0	1.38E-13	1.72E-06	1.35E-13
1.0E 03	2.44E-11	6.82E-15	1.50E-02	9.07E-03	5.55E-08	5.27E-07	0.0	1.35E-13	0.0	1.35E-13	6.42E-07	1.35E-13
2.0E 03	1.19E-20	6.52E-15	1.47E-02	7.83E-03	5.55E-08	5.26E-07	0.0	1.30E-13	0.0	1.30E-13	8.78E-08	1.30E-13
5.0E 03	9.42E-44	1.53E-14	1.19E-02	5.32E-03	5.55E-08	5.25E-07	0.0	1.15E-13	0.0	1.15E-13	2.64E-10	1.15E-13
1.0E 04	0.0	3.23E-14	7.53E-03	2.83E-03	5.55E-08	5.21E-07	0.0	9.65E-14	0.0	9.65E-14	1.29E-14	9.65E-14
2.0E 04	0.0	5.41E-14	3.24E-03	5.99E-04	5.55E-08	5.13E-07	0.0	6.35E-14	0.0	6.35E-14	3.81E-23	6.35E-14
5.0E 04	0.0	1.55E-13	2.02E-04	6.73E-08	5.55E-08	2.49E-07	0.0	1.42E-14	0.0	1.42E-14	7.42E-49	1.92E-14
1.0E 05	0.0	2.40E-13	3.75E-05	4.27E-09	5.55E-08	6.08E-08	0.0	2.04E-15	0.0	2.04E-15	0.0	2.04E-15
2.0E 05	0.0	1.49E-12	1.03E-05	3.12E-12	5.55E-08	1.44E-07	0.0	3.19E-22	0.0	3.19E-22	0.0	3.19E-22
5.0E 05	0.0	1.49E-12	6.51E-06	8.83E-20	5.54E-08	4.57E-08	0.0	0.0	0.0	2.90E-26	0.0	8.49E-26
1.0E 06	0.0	1.33E-12	0.0	0.0	5.54E-08	4.17E-10	0.0	0.0	0.0	0.0	0.0	0.0
2.0E 06	0.0	7.21E-13	0.0	0.0	5.41E-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0

YEAR	CM-251	CM-252	CF-251	CM-253	BK-253
1.0E 00	2.59E-07	9.18E-05	6.25E-14	5.92E-11	9.78E-12
2.0E 00	2.59E-07	7.05E-05	2.39E-20	5.82E-13	2.55E-17
5.0E 00	2.58E-07	3.21E-05	8.54E-39	5.11E-18	3.17E-33
1.0E 01	2.57E-07	8.67E-06	0.0	0.0	9.87E-66
2.0E 01	2.55E-07	6.31E-07	0.0	0.0	0.0
5.0E 01	2.49E-07	2.44E-10	0.0	0.0	0.0
1.0E 02	2.40E-07	4.49E-16	0.0	0.0	0.0
2.0E 02	2.22E-07	2.09E-27	0.0	0.0	0.0
5.0E 02	1.76E-07	1.56E-51	0.0	0.0	0.0
1.0E 03	1.20E-07	0.0	0.0	0.0	0.0
2.0E 03	5.55E-08	0.0	0.0	0.0	0.0
5.0E 03	5.51E-09	0.0	0.0	0.0	0.0
1.0E 04	1.17E-10	0.0	0.0	0.0	0.0
2.0E 04	5.20E-14	0.0	0.0	0.0	0.0
5.0E 04	9.07E-24	0.0	0.0	0.0	0.0
1.0E 05	9.17E-41	0.0	0.0	0.0	0.0
5.0E 05	0.0	0.0	0.0	0.0	0.0
1.0E 06	0.0	0.0	0.0	0.0	0.0
1.0E 07	0.0	0.0	0.0	0.0	0.0
1.0E 08	0.0	0.0	0.0	0.0	0.0

Table D6. Significant Actinide Activity From HTGR Equilibrium Fuel Cycle - Recovered Uranium

Curies Per Kilogram of Recovered Uranium

YEAR	TL-207	TL-208	TL-209	PB-209	PB-210	PB-211	PB-212	PB-214	BI-210	BI-211	BI-212	BI-213
1.0E 00	3.17E-11	2.55E-01	7.72E-06	3.51E-06	2.14E-11	8.14E-11	7.99E-01	1.49E-09	2.14E-11	8.19E-11	7.09E-01	3.51E-06
2.0E 00	3.25E-10	9.3cE-01	1.56E-05	7.0cE-06	1.71E-10	3.26E-10	1.20E 00	7.96E-09	1.71E-10	3.26E-10	1.20E 00	7.02E-06
5.0E 00	1.97E-09	6.87E-01	3.86E-05	1.75E-05	2.06E-09	1.97E-09	1.91E 00	4.97E-08	2.62E-09	1.97E-09	1.91E 00	1.75E-05
1.0E 01	7.98E-09	7.00E-01	7.72E-05	3.51E-05	2.03E-08	7.51E-09	2.13E 00	1.99E-07	2.01E-08	7.51E-09	2.13E 00	3.51E-05
2.0E 01	2.71E-08	7.19E-01	1.54E-04	7.01E-05	1.49E-07	2.72E-08	1.99E 00	7.94E-07	1.69E-07	2.72E-08	1.99E 00	7.01E-05
5.0E 01	1.29E-07	9.19E-01	3.85E-04	1.75E-04	1.03E-06	1.32E-07	1.99E 00	4.96E-06	1.84E-06	1.30E-07	1.99E 00	1.75E-04
1.0E 02	3.61E-07	3.51E-01	7.67E-04	3.49E-04	4.11E-05	3.62E-07	9.14E-01	1.46E-05	1.12E-05	3.62E-07	9.19E-01	3.49E-04
2.0E 02	8.59E-07	1.20E-01	1.53E-03	6.99E-04	3.70E-05	8.70E-07	3.91E-01	7.73E-05	5.76E-05	8.70E-07	3.91E-01	6.99E-04
5.0E 02	2.09E-06	7.03E-03	3.77E-03	1.71E-03	9.12E-04	2.09E-06	1.49E-02	4.03E-04	4.12E-04	2.09E-06	1.49E-02	1.71E-03
1.0E 03	4.43E-06	5.70E-05	7.53E-03	3.36E-03	4.05E-03	4.05E-06	1.58E-04	1.72E-03	1.63E-03	4.05E-06	1.58E-04	3.36E-03
2.0E 03	1.01E-05	4.35E-09	1.47E-02	6.35E-03	2.09E-03	1.01E-05	1.21E-03	6.03E-03	6.09E-03	1.01E-05	1.21E-03	6.35E-03
5.0E 03	2.49E-05	1.47E-04	3.34E-02	1.43E 00	2.80E-02	2.49E-05	4.04E-03	2.66E-02	2.66E-02	2.49E-05	4.04E-03	1.38E 00
1.0E 04	4.63E-05	2.49E-04	4.68E-02	2.21E 00	5.77E-02	4.65E-05	4.16E-03	6.77E-02	6.77E-02	4.63E-05	4.16E-03	2.21E 00
2.0E 04	8.58E-05	5.87E-04	6.55E-02	2.98E 00	1.47E-01	8.63E-05	1.63E-02	1.47E-01	1.47E-01	8.63E-05	1.63E-02	2.97E 00
5.0E 04	1.55E-04	1.47E-03	8.83E-02	3.89E 00	3.53E-01	1.57E-04	4.04E-02	3.34E-01	3.34E-01	1.54E-04	4.04E-02	3.89E 00
1.0E 05	2.13E-04	2.49E-03	5.55E-02	2.52E 00	5.23E-01	2.13E-04	8.15E-02	5.23E-01	5.23E-01	2.13E-04	8.15E-02	2.52E 00
5.0E 05	2.44E-04	1.49E-02	1.03E-02	4.55E-01	3.69E-01	2.42E-04	4.05E-03	3.69E-01	3.69E-01	2.42E-04	4.04E-03	4.55E-01
1.0E 06	2.61E-04	2.03E-01	1.13E-03	5.36E-04	4.52E-02	2.42E-04	8.04E-03	9.56E-02	9.55E-02	2.42E-04	8.04E-03	5.36E-02
1.0E 07	2.39E-04	2.55E-06	3.02E-13	7.37E-14	2.17E-05	2.39E-04	7.03E-06	2.17E-05	2.17E-05	2.39E-04	7.03E-06	7.37E-12
1.0E 08	2.14E-04	4.54E-06	3.26E-26	1.40E-24	2.03E-05	2.14E-04	2.65E-05	2.08E-05	2.03E-05	2.14E-04	2.65E-05	1.40E-24

YEAR	BI-214	PO-210	PO-211	PO-212	PO-213	PO-214	PO-215	PO-216	PO-218	AT-217	RN-219	RN-220
1.0E 00	1.99E-11	3.35E-12	2.40E-13	9.56E-01	3.49E-04	1.74E-09	8.12E-11	7.09E-01	1.99E-04	8.31E-04	8.14E-11	7.09E-01
2.0E 00	7.96E-09	3.25E-11	9.78E-13	7.00E-01	3.47E-04	7.98E-09	3.25E-10	1.20E 00	7.96E-09	7.02E-04	3.25E-10	1.20E 00
5.0E 00	4.97E-08	1.91E-09	5.92E-12	1.22E 00	1.72E-03	4.97E-08	1.97E-09	1.91E 00	4.97E-08	1.73E-03	1.97E-09	1.91E 00
1.0E 01	1.99E-07	1.70E-08	2.23E-11	1.32E 00	3.43E-03	1.99E-07	7.51E-09	2.13E 00	1.99E-07	3.51E-03	7.51E-09	2.13E 00
2.0E 01	7.94E-07	1.49E-07	8.15E-11	1.27E 00	6.80E-03	7.94E-07	2.72E-08	1.99E 00	7.94E-07	7.01E-03	2.72E-08	1.99E 00
5.0E 01	4.96E-06	1.84E-06	3.03E-10	9.51E-01	1.71E-02	4.96E-06	1.83E-07	1.99E 00	4.96E-06	1.75E-02	1.80E-07	1.99E 00
1.0E 02	1.96E-05	1.12E-05	1.08E-09	5.03E-01	3.44E-02	1.73E-05	3.62E-07	9.19E-01	1.96E-05	3.49E-02	3.62E-07	9.19E-01
2.0E 02	7.73E-05	2.73E-05	2.01E-09	2.24E-01	6.83E-02	7.73E-05	8.70E-07	9.51E-01	7.73E-05	6.93E-02	8.70E-07	9.51E-01
5.0E 02	4.63E-04	4.12E-04	7.22E-09	1.23E-02	1.27E-01	4.63E-04	2.04E-06	1.93E-02	4.63E-04	1.71E-01	2.04E-06	1.95E-02
1.0E 03	1.72E-03	1.63E-03	1.49E-08	1.01E-02	3.27E-01	1.72E-03	4.95E-06	1.58E-04	1.72E-03	3.34E-01	4.95E-06	1.58E-04
2.0E 03	6.09E-03	6.09E-03	3.03E-08	7.73E-03	6.22E-01	6.09E-03	1.21E-05	1.21E-02	6.09E-03	6.30E-01	1.21E-05	1.21E-02
5.0E 03	2.60E-02	2.56E-02	7.34E-08	2.61E-03	1.53E 00	2.60E-02	2.45E-05	9.08E-03	2.60E-02	1.36E 00	2.45E-05	4.08E-03
1.0E 04	6.77E-02	6.77E-02	1.34E-07	5.22E-04	2.10E 00	6.77E-02	4.65E-05	8.16E-03	6.77E-02	2.21E 00	4.65E-05	8.16E-03
2.0E 04	1.47E-01	1.47E-01	2.52E-07	1.09E-03	2.91E 00	1.47E-01	8.62E-05	1.63E-02	1.47E-01	2.97E 00	8.60E-05	1.63E-02
5.0E 04	3.34E-01	3.34E-01	4.70E-07	2.04E-03	3.82E 00	3.34E-01	1.53E-04	4.08E-03	3.34E-01	3.89E 00	1.54E-04	4.08E-03
1.0E 05	5.20E-01	5.20E-01	6.40E-07	5.21E-03	2.49E 00	5.20E-01	2.13E-04	8.15E-03	5.20E-01	2.52E 00	2.13E-04	8.15E-03
5.0E 05	3.69E-01	3.69E-01	7.25E-07	2.59E-03	9.95E-01	3.69E-01	2.42E-04	4.05E-03	3.69E-01	9.55E-01	2.42E-04	4.05E-03
1.0E 06	9.55E-02	9.55E-02	7.23E-07	5.13E-04	2.57E-01	9.55E-02	2.42E-04	8.04E-03	9.56E-02	2.38E-02	2.42E-04	8.04E-03
1.0E 07	2.17E-05	2.17E-05	7.14E-07	9.03E-06	7.20E-12	2.17E-05	2.39E-04	7.03E-06	2.17E-05	7.37E-12	2.33E-04	7.03E-06
1.0E 08	2.03E-05	2.03E-05	6.59E-07	1.04E-05	1.40E-24	2.03E-05	2.14E-04	2.65E-05	2.03E-05	1.40E-24	2.14E-04	2.65E-05

Table D6. Cont'd.

Curies Per Kilogram of Recovered Uranium

YEAR	RN-222	FR-221	FR-223	RA-223	RA-224	RA-225	RA-226	RA-228	AC-225	AC-227	AC-228	TH-227
1.0E 00	1.9[illegible]E-04	3.01E-06	1.15E-12	9.19E-11	7.09E-01	3.01E-06	1.99E-09	9.08E-14	3.51E-06	8.19E-11	4.08E-14	8.08E-11
2.0E 00	7.96E-04	7.02E-06	4.55E-12	3.20E-10	1.20E 00	7.02E-06	7.98E-09	1.58E-13	7.02E-06	3.25E-10	1.58E-13	3.21E-10
3.0E 00	9.47E-06	1.75E-03	2.70E-11	1.97E-09	1.91E 00	1.75E-03	9.97E-08	8.95E-13	1.75E-03	1.97E-09	8.95E-13	1.95E-09
1.0E 01	1.99E-07	1.31E-03	1.05E-10	7.31E-09	2.11E 00	1.31E-03	1.99E-07	3.08E-12	1.31E-03	7.99E-09	3.08E-12	7.40E-09
2.0E 01	7.99E-07	7.01E-03	3.63E-10	2.72E-08	1.98E 00	7.01E-03	7.99E-07	9.63E-12	7.01E-03	2.71E-08	9.63E-12	2.68E-08
3.0E 01	9.49E-06	1.73E-02	1.82E-09	1.30E-07	1.99E 00	1.73E 02	9.99E-06	3.30E-11	1.75E-02	1.30E-07	3.30E-11	1.28E-07
1.0E 02	1.79E-05	3.49E-02	5.03E-09	3.06E-07	1.99E-01	3.49E-02	1.98E-05	7.37E-11	3.49E-02	3.02E-07	7.37E-11	3.57E-07
2.0E 02	1.73E-04	8.69E-02	1.22E-08	8.70E-07	3.51E-01	8.95E-02	1.71E-05	1.55E-10	8.45E-02	8.70E-07	1.55E-10	8.58E-07
3.0E 02	9.63E-04	1.71E-01	3.37E-08	2.94E-06	1.49E-02	1.71E-01	9.83E-05	4.08E-10	1.71E-01	2.91E-06	4.08E-10	2.37E-06
1.0E 03	1.72E-03	3.39E-01	8.49E-08	9.49E-06	1.53E-03	3.34E-01	1.72E-03	8.10E-10	3.34E-01	9.49E-06	8.10E-10	9.88E-06
2.0E 03	9.56E-03	8.35E-01	1.91E-07	1.02E-05	1.21E-08	8.35E-01	6.09E-03	1.63E-09	8.30E-01	1.01E-05	1.63E-09	9.97E-06
3.0E 03	2.69E-02	1.39E 00	3.44E-07	2.49E-05	9.08E-09	1.39E 00	2.53E-02	9.08E-09	1.38E 00	2.49E-05	4.08E-09	2.41E-05
1.0E 04	9.77E-02	2.21E 00	6.51E-07	9.52E-05	8.10E-09	2.21E 00	8.77E-02	8.10E-09	2.21E 00	9.53E-05	8.10E-09	9.58E-05
2.0E 04	1.67E-01	2.47E 00	1.13E-06	8.93E-05	1.63E-08	2.47E 00	1.67E-01	1.63E-08	2.47E 00	8.93E-05	1.63E-08	8.29E-05
3.0E 04	3.34E-01	3.09E 00	2.22E-06	1.56E-04	9.08E-08	3.08E 00	3.34E-01	9.08E 08	3.09E 00	1.59E-04	9.09E-08	1.56E-04
1.0E 05	9.23E-01	2.52E 00	2.49E-06	2.13E-04	8.15E-08	2.52E 00	9.23E-01	8.15E-08	2.52E 00	2.13E-04	8.15E-08	2.10E-04
2.0E 05	3.04E-01	9.03E-01	3.33E-06	2.94E-04	9.03E-07	9.03E-01	3.04E-01	9.03E-07	9.55E-01	2.92E-04	9.03E-07	2.38E-04
1.0E 06	9.53E-02	3.30E-02	3.38E-06	2.94E-04	8.04E-07	9.53E-02	9.53E-02	8.04E-07	9.35E-02	2.92E-04	8.04E-07	2.36E-04
1.0E 07	2.17E-03	7.37E-12	3.35E-06	2.36E-04	7.03E-06	7.37E-12	2.17E-05	7.08E-06	7.37E-12	2.36E-04	7.08E-06	2.36E-04
1.0E 08	2.08E-05	1.49E-24	3.07E-06	2.14E-04	2.65E-05	1.49E-24	2.08E-05	2.65E-05	1.48E-24	2.14E-04	2.65E-05	2.16E-04

YEAR	TH-229	TH-230	TH-232	TH-231	TH-232	TH-234	PA-231	PA-233	PA-234M	PA-234	U-232	U-233
1.0E 00	7.09E-01	3.51E-04	9.14E-08	2.42E-04	8.10E-13	2.11E-05	5.10E-09	1.74E-10	2.11E-05	2.11E-08	2.32E 00	3.69E 00
2.0E 00	1.20E 00	7.02E-04	1.84E-05	4.84E-04	1.63E-12	2.11E-05	1.04E-08	1.74E-10	2.11E-05	2.11E-08	2.30E 00	3.69E 00
3.0E 00	1.49E 00	1.75E-03	4.60E-05	2.42E-04	9.03E-12	2.11E-05	2.59E-08	1.74E-10	2.11E-05	2.11E-08	2.23E 00	3.69E 00
1.0E 01	2.12E 00	3.51E-03	9.14E-05	2.42E-04	8.10E-12	2.11E-05	5.13E-08	1.74E-10	2.11E-05	2.11E-08	2.13E 00	3.69E 00
2.0E 01	1.49E 00	7.01E-03	1.84E-04	2.42E-04	1.03E-11	2.11E-05	1.03E-07	1.74E-10	2.11E-05	2.11E-08	1.93E 00	3.69E 00
3.0E 01	1.49E 00	1.75E-02	4.59E-04	2.42E-04	9.03E-11	2.11E-05	2.58E-07	1.74E-10	2.11E-05	2.11E-08	1.49E 00	3.59E 00
1.0E 02	9.18E-01	3.49E-02	9.14E-04	2.42E-04	8.10E-11	2.11E-05	5.16E-07	1.74E-10	2.11E-05	2.11E-08	8.94E-01	3.69E 00
2.0E 02	3.51E-01	6.95E-02	1.84E-03	2.42E-04	1.03E-10	2.11E-05	1.03E-06	1.74E-10	2.11E-05	2.11E-08	3.41E-01	3.69E 00
3.0E 02	1.69E-01	1.71E-01	4.50E-03	2.42E-04	9.08E-10	2.11E-05	2.57E-06	1.73E-10	2.11E-05	2.11E-08	1.40E-02	3.69E 00
1.0E 03	1.58E-01	3.39E-01	9.14E-03	2.42E-04	8.10E-10	2.11E-05	5.13E-06	1.73E-10	2.11E-05	2.11E-08	1.54E-04	3.69E 00
2.0E 03	1.21E-06	8.36E-01	1.82E-02	2.42E-04	1.03E-09	2.11E-05	1.01E-05	1.73E-10	2.11E-05	2.11E-08	1.02E-08	3.66E 00
5.0E 03	4.08E-04	1.33E 00	4.47E-02	2.42E-04	8.08E-09	2.11E-05	2.49E-05	1.73E-10	2.11E-05	2.11E-08	2.90E-21	3.52E 00
1.0E 04	4.16E-04	2.21E 00	8.86E-02	2.42E-04	8.10E-09	2.11E-05	4.65E-05	1.73E-10	2.11E-05	2.11E-08	3.60E-42	3.56E 00
2.0E 04	1.03E-08	2.47E 00	1.84E-01	2.42E-04	1.03E-08	2.11E-05	8.40E-05	1.72E-10	2.11E-05	2.11E-08	0.0	3.39E 00
5.0E 04	4.09E-03	3.09E 00	3.40E-01	2.42E-04	9.03E-08	2.11E-05	1.54E-04	1.71E-10	2.11E-05	2.11E-08	0.0	2.98E 00
1.0E 05	8.15E-04	2.52E 00	5.25E-01	2.42E-04	8.10E-08	2.11E-05	2.13E-04	1.68E-10	2.11E-05	2.11E-08	0.0	2.41E 00
2.0E 05	4.05E-07	9.05E-01	3.80E-01	2.42E-04	9.03E-07	2.11E-05	2.42E-04	1.48E-10	2.11E-05	2.11E-08	0.0	4.35E-01
1.0E 06	3.04E-07	5.35E-02	9.49E-02	2.42E-04	8.04E-07	2.11E-05	2.42E-04	1.25E-10	2.11E-05	2.11E-08	0.0	5.12E-02
1.0E 07	7.04E-08	7.37E-12	2.17E-05	2.36E-04	7.03E-06	2.11E-05	2.36E-04	6.03E-12	2.11E-05	2.11E-08	0.0	7.36E-12
1.0E 08	2.65E-05	1.49E-24	2.03E-05	2.14E-04	2.65E-05	2.03E-05	2.14E-04	1.48E-24	2.08E-05	2.03E-08	0.0	1.49E-24

Table D6. Cont'd.

Curies Per Kilogram of Recovered Uranium

YEAR	U-233	U-235	U-236	U-237	U-238	NP-237	PU-240
1.0E 00	1.06E 00	2.92E-04	1.66E-02	1.33E-10	4.11E-05	1.74E-10	1.13E-22
2.0E 00	1.06E 00	2.92E-04	1.66E-02	5.40E-03	4.11E-05	1.74E-10	1.13E-22
5.0E 00	1.06E 00	2.92E-04	1.66E-02	0.0	4.11E-05	1.74E-10	1.13E-22
1.0E 01	1.06E 00	2.92E-04	1.66E-02	0.0	4.11E-05	1.74E-10	1.13E-22
2.0E 01	1.06E 00	2.92E-04	1.66E-02	0.0	4.11E-05	1.74E-10	1.13E-22
5.0E 01	1.06E 00	2.92E-04	1.66E-02	0.0	4.11E-05	1.74E-10	1.13E-22
1.0E 02	1.06E 00	2.92E-04	1.66E-02	0.0	4.11E-05	1.74E-10	1.13E-22
2.0E 02	1.06E 00	2.92E-04	1.66E-02	0.0	4.11E-05	1.74E-10	1.13E-22
5.0E 02	1.06E 00	2.92E-04	1.66E-02	0.0	4.11E-05	1.73E-10	1.13E-22
1.0E 03	1.06E 00	2.92E-04	1.66E-02	0.0	4.11E-05	1.73E-10	1.13E-22
2.0E 03	1.05E 00	2.92E-04	1.66E-02	0.0	4.11E-05	1.73E-10	9.91E-23
5.0E 03	1.03E 00	2.92E-04	1.66E-02	0.0	4.11E-05	1.73E-10	7.16E-23
1.0E 04	1.03E 00	2.92E-04	1.66E-02	0.0	4.11E-05	1.73E-10	4.84E-23
2.0E 04	1.00E 00	2.92E-04	1.66E-02	0.0	4.11E-05	1.72E-10	1.40E-23
5.0E 04	9.22E-01	2.92E-04	1.66E-02	0.0	4.11E-05	1.71E-10	0.0
1.0E 05	8.51E-01	2.92E-04	1.65E-02	0.0	4.11E-05	1.64E-10	0.0
5.0E 05	2.61E-01	2.92E-04	1.66E-02	0.0	4.11E-05	1.49E-10	0.0
1.0E 06	6.49E-02	2.92E-04	1.61E-02	0.0	4.11E-05	1.43E-10	0.0
1.0E 07	2.13E-05	2.89E-04	1.24E-02	0.0	4.10E-05	6.80E-12	0.0
1.0E 08	2.08E-08	2.14E-04	9.13E-03	0.0	4.09E-05	1.49E-24	0.0

Table D7. Significant Actinide Activity From HTGR Plutonium Fuel Cycle - Spent Fuel

Curies Per Metric Ton of Heavy Metal Charged To Reactor

YEAR	TL-208	TL-208	TL-209	PB-209	PB-210	PB-211	PB-212	PB-214	BI-210	BI-211	BI-212	BI-213
1.0E 00	2.14E-27	3.59E 01	2.22E-03	1.00E-01	3.40E-07	2.19E-02	1.03E 02	6.19E-06	3.40E-07	2.14E-02	1.03E 02	1.00E-01
2.0E 00	2.87E-02	3.87E 01	2.00E-03	1.20E-01	5.70E-07	2.60E-02	1.06E 02	8.40E-06	5.71E-07	2.88E-02	1.04E 02	1.20E-01
5.0E 00	4.76E-02	3.27E 01	3.94E-03	1.84E-01	1.07E-06	4.74E-02	1.13E 02	1.02E-05	1.07E-06	4.79E-02	1.13E 02	1.81E-01
1.0E 01	7.54E-02	4.03E 01	6.20E-03	2.82E-01	1.13E-06	7.61E-02	1.11E 02	1.31E-05	1.13E-06	7.61E-02	1.11E 02	2.82E-01
2.0E 01	1.20E-01	3.05E 01	1.00E-02	4.83E-01	1.47E-05	1.20E-01	1.01E 02	8.14E-05	1.47E-05	1.20E-01	1.01E 02	4.83E-01
5.0E 01	1.96E-01	2.73E 01	2.87E-02	1.09E 00	1.95E-05	1.93E-01	7.65E 01	3.43E-04	1.45E-05	1.93E-01	7.65E 01	1.09E 00
1.0E 02	2.28E-01	1.99E 01	4.69E-02	2.09E 00	6.90E-05	2.28E-01	4.70E 01	1.17E-03	6.97E-05	2.28E-01	4.70E 01	2.09E 00
2.0E 02	2.39E-01	8.49E 00	8.97E-02	4.08E 00	3.24E-03	2.38E-01	1.83E 01	4.30E-03	3.24E-03	2.39E-01	1.83E 01	4.08E 00
5.0E 02	2.39E-01	3.42E-01	2.14E-01	9.93E 00	2.23E-02	2.35E-01	1.09E 00	2.50E-02	2.23E-02	2.33E-01	1.09E 00	9.93E 00
1.0E 03	2.32E-01	3.81E-02	4.25E-01	1.93E 01	3.81E-02	2.33E-01	1.03E-01	9.33E-02	6.81E-02	2.33E-01	1.03E-01	1.93E 01
2.0E 03	2.26E-01	3.52E-03	8.07E-01	3.67E 01	3.27E-01	2.24E-01	9.21E-02	3.27E-01	3.27E-01	2.26E-01	9.21E-02	3.67E 01
5.0E 03	2.13E-01	3.36E-02	1.73E 00	7.93E 01	1.44E 00	2.14E-01	9.21E-02	1.44E 00	1.44E 00	2.14E-01	9.21E-02	7.95E 01
1.0E 04	1.93E-01	3.32E-02	2.68E 00	1.27E 02	3.08E 00	1.93E-01	9.21E-02	3.08E 00	3.08E 00	1.93E-01	9.21E-02	1.27E 02
2.0E 04	1.57E-01	3.32E-02	3.77E 00	1.71E 02	7.48E 00	1.53E-01	9.21E-02	7.48E 00	7.48E 00	1.56E-01	9.21E-02	1.71E 02
5.0E 04	8.88E-02	3.31E-02	3.42E 00	1.78E 02	1.82E 01	8.93E-02	9.21E-02	1.82E 01	1.82E 01	8.93E-02	9.21E-02	1.78E 02
1.0E 05	4.87E-02	3.32E-02	3.42E 00	1.78E 02	2.01E 01	1.73E-02	9.22E-02	2.01E 01	2.01E 01	1.73E-02	9.22E-02	2.71E 01
1.0E 06	1.73E-02	3.32E-02	8.73E-02	3.95E 00	5.20E 00	1.73E-02	9.22E-02	5.20E 00	5.20E 00	1.73E-02	9.22E-02	3.95E 00
1.0E 07	1.66E-02	3.32E-02	1.02E-03	4.69E-02	1.69E-02	9.24E-02	2.32E-03	1.69E-02	9.24E-02	9.24E-02	9.24E-02	4.69E-02
1.0E 08	1.59E-02	3.34E-02	2.30E-16	9.35E-15	2.23E-03	1.55E-02	9.27E-02	2.23E-03	2.23E-03	1.55E-02	9.27E-02	9.35E-15

YEAR	BI-214	PO-210	PO-211	PO-212	PO-213	PO-214	PO-215	PO-216	PO-218	AT-217	RN-219	RN-220
1.0E 00	6.19E-06	2.50E-07	5.33E-05	6.57E 01	4.78E-02	6.19E-06	2.19E-02	1.03E 02	6.19E-06	1.30E-01	2.14E-02	1.03E 02
2.0E 00	5.40E-05	4.45E-07	8.84E-05	6.85E 01	1.16E-01	8.40E-06	2.83E-02	1.06E 02	8.40E-06	1.20E-01	2.88E-02	1.06E 02
5.0E 00	1.62E-05	1.41E-06	1.44E-04	7.23E 01	4.77E-01	1.62E-05	6.79E-02	1.13E 02	1.62E-05	1.81E-01	4.79E-02	1.13E 02
1.0E 01	3.31E-05	4.00E-06	2.28E-04	7.16E 01	2.75E-01	3.31E-05	7.61E-02	1.11E 02	3.31E-05	2.82E-01	7.61E-02	1.11E 02
2.0E 01	8.14E-05	1.47E-05	3.61E-04	6.99E 01	4.73E-01	8.14E-05	1.20E-01	1.01E 02	8.14E-05	4.83E-01	1.20E-01	1.01E 02
5.0E 01	2.93E-04	1.40E-04	5.70E-04	6.85E 01	1.09E 00	3.43E-04	1.93E-01	7.65E 01	3.43E-04	1.09E 00	1.93E-01	7.65E 01
1.0E 02	1.17E-03	5.47E-04	6.85E-04	3.01E 01	2.09E 00	1.17E-03	2.28E-01	4.70E 01	1.17E-03	2.09E 00	2.28E-01	4.70E 01
2.0E 02	4.30E-03	2.00E-03	7.00E-04	1.13E 01	3.99E 00	4.30E-03	2.36E-01	1.83E 01	4.30E-03	4.08E 00	2.36E-01	1.83E 01
5.0E 02	2.50E-02	1.23E-02	7.07E-04	6.97E-01	4.71E 00	2.50E-02	2.35E-01	1.09E 00	2.50E-02	9.93E 00	2.35E-01	1.09E 00
1.0E 03	9.33E-02	5.81E-02	6.83E-04	6.42E-02	1.09E 01	9.33E-02	2.33E-01	1.30E-01	9.33E-02	1.93E 01	2.33E-01	1.03E-01
2.0E 03	3.27E-01	3.27E-01	6.83E-04	5.90E-02	3.09E 01	3.27E-01	2.26E-01	9.21E-02	3.27E-01	3.67E 01	2.26E-01	9.21E-02
5.0E 03	1.44E 00	1.44E 00	6.83E-04	5.90E-02	7.79E 01	1.44E 00	2.14E-01	9.21E-02	1.44E 00	7.95E 01	2.14E-01	9.21E-02
1.0E 04	3.08E 00	3.08E 00	6.83E-04	5.90E-02	1.27E 02	3.08E 00	1.93E-01	9.21E-02	3.08E 00	1.27E 02	1.93E-01	9.21E-02
2.0E 04	7.48E 00	7.48E 00	6.83E-04	5.90E-02	1.71E 02	7.48E 00	1.56E-01	9.21E-02	7.48E 00	1.71E 02	1.56E-01	9.21E-02
5.0E 04	1.82E 01	1.82E 01	6.83E-04	5.90E-02	1.78E 02	1.82E 01	8.93E-02	9.21E-02	1.82E 01	1.78E 02	8.93E-02	9.21E-02
1.0E 05	2.01E 01	2.01E 01	6.83E-04	5.90E-02	1.78E 02	2.01E 01	1.73E-02	9.22E-02	2.01E 01	2.71E 01	1.73E-02	9.22E-02
1.0E 06	5.20E 00	5.20E 00	6.83E-04	5.90E-02	3.95E 00	5.20E 00	1.70E-02	9.22E-02	5.20E 00	3.95E 00	1.70E-02	9.22E-02
1.0E 07	2.32E-03	2.32E-03	6.83E-04	5.90E-02	4.69E-02	2.32E-03	1.69E-02	9.24E-02	2.32E-03	1.69E-02	9.24E-02	4.69E-02
1.0E 08	2.23E-03	2.23E-03	6.83E-04	5.90E-02	9.35E-15	2.23E-03	1.55E-02	9.27E-02	2.23E-03	9.35E-15	1.55E-02	9.27E-02

Table D7. Cont'd.

Curies Per Metric Ton of Heavy Metal Charged To Reactor

YEAR	RN-222	FR-221	FR-223	RA-223	RA-224	RA-225	RA-226	RA-228	AC-225	AC-227	AC-228	TH-227
1.0E 00	5.17E-05	1.03E-01	3.35E-04	2.13E-02	1.03E-02	1.00E-01	6.14E-06	9.05E-02	1.00E-01	2.49E-02	4.05E-02	2.16E-02
2.0E 00	3.49E-05	1.23E-01	9.32E-04	2.83E-02	1.00E-02	1.23E-01	8.43E-06	9.55E-02	1.20E-01	2.87E-02	4.55E-02	2.84E-02
5.0E 00	1.62E-05	1.46E-01	6.73E-04	4.78E-02	1.13E-02	1.81E-01	1.62E-05	5.80E-02	1.81E-01	4.78E-02	5.80E-02	4.73E-02
1.0E 01	9.31E-05	2.42E-01	1.35E-03	7.61E-02	1.11E-02	2.82E-01	3.31E-05	7.14E-02	2.82E-01	7.19E-02	7.19E-02	7.53E-02
2.0E 01	3.14E-05	4.83E-01	1.69E-03	1.20E-01	1.01E-02	4.83E-01	8.14E-05	3.99E-02	4.83E-01	1.20E-01	8.49E-02	1.19E-01
5.0E 01	2.45E-04	1.09E 00	2.69E-03	1.93E-01	7.20E 01	1.09E 00	3.43E-04	9.14E-02	1.09E 00	1.92E-01	9.18E-02	1.93E-01
1.0E 02	1.17E-03	2.03E 00	5.44E-03	2.20E-01	4.73E 01	2.03E 00	1.17E-03	9.21E-02	2.09E 00	2.29E-01	9.21E-02	2.27E-01
2.0E 02	4.30E-03	4.00E 00	1.33E-02	2.30E-01	4.83E 01	4.03E 00	4.33E-03	9.21E-02	4.03E 00	2.30E-01	9.21E-02	2.33E-01
5.0E 02	2.03E-02	9.93E 00	3.24E-02	2.33E-01	4.83E 01	9.93E 00	2.53E-02	9.22E-02	9.93E 00	2.33E-01	9.22E-02	2.32E-01
1.0E 03	9.33E-02	1.93E 01	5.20E-02	2.33E-01	4.83E 01	1.93E 01	9.33E-02	9.22E-02	1.93E 01	2.33E-01	9.22E-02	2.32E-01
2.0E 03	3.67E-01	3.67E 01	5.14E-02	2.33E-01	4.83E 01	3.67E 01	3.27E-01	9.21E-02	3.67E 01	2.28E-01	9.21E-02	2.25E-01
5.0E 03	1.44E 00	7.49E 01	5.33E-02	2.14E-01	4.83E 01	7.49E 01	1.44E 00	9.21E-02	7.49E 01	2.14E-01	9.21E-02	2.11E-01
1.0E 04	3.00E 00	1.27E 02	2.71E-02	1.93E-01	4.83E 01	1.27E 02	3.93E 00	9.21E-02	1.27E 02	1.93E-01	9.21E-02	1.91E-01
2.0E 04	7.49E 00	1.47E 02	2.22E-02	1.90E-01	4.83E 01	1.71E 02	1.44E 00	9.21E-02	1.71E 02	1.90E-01	9.21E-02	1.55E-01
5.0E 04	1.92E 01	1.73E 02	1.23E-02	8.90E-02	4.83E-02	1.78E 02	1.82E 01	9.21E-02	1.78E 02	8.90E-02	9.21E-02	8.73E-02
1.0E 05	2.68E 01	1.49E 02	5.71E-03	4.70E-02	4.83E-02	1.49E 02	2.83E 01	4.21E-02	1.49E 02	4.70E-02	9.21E-02	4.61E-02
5.0E 05	2.01E 01	2.71E 01	2.85E-04	1.70E-02	4.83E-02	2.71E 01	2.01E 01	4.22E-02	2.71E 01	1.70E-02	9.22E-02	1.68E-02
1.0E 06	2.02E 00	3.93E 00	2.93E-04	1.70E-02	4.83E-02	3.93E 00	5.20E 00	4.22E-02	3.93E 00	1.70E-02	9.22E-02	1.68E-02
1.2E 07	2.03E-03	9.09E-02	2.85E-04	1.69E-02	4.83E-02	6.56E-02	2.32E-03	9.24E-02	6.64E-02	1.69E-02	9.24E-02	1.66E-02
1.0E 08	2.03E-03	9.35E-15	2.11E-04	1.55E-02	4.67E-02	9.35E-15	2.23E-03	9.27E-02	9.35E-15	1.55E-02	9.27E-02	1.52E-02

YEAR	TH-229	TH-229	TH-230	TH-231	TH-232	TH-234	PA-231	PA-233	PA-234M	PA-234	U-232	U-233
1.0E 00	1.03E-02	1.03E-01	6.83E-03	7.35E-03	9.21E-02	3.00E-03	2.37E-01	1.14E 02	3.00E-03	3.70E-06	1.18E 02	2.13E 02
2.0E 00	1.07E-02	1.23E-01	9.34E-03	7.35E-03	9.21E-02	2.00E-04	2.37E-01	6.14E-01	2.60E-04	2.00E-07	1.17E 02	2.13E 02
5.0E 00	1.13E-02	1.81E-01	6.67E-03	7.35E-03	9.21E-02	2.00E-04	2.37E-01	6.09E-01	2.60E-04	2.00E-07	1.14E 02	2.13E 02
1.0E 01	1.11E-02	2.82E-01	6.64E-03	7.35E-03	9.21E-02	2.60E-04	2.37E-01	6.13E-01	2.60E-04	2.00E-07	1.14E 02	2.13E 02
2.0E 01	1.01E-02	4.83E-01	1.93E-02	7.35E-03	9.21E-02	2.00E-04	2.37E-01	6.14E-01	2.60E-04	2.00E-07	1.14E 02	2.13E 02
5.0E 01	7.20E-03	1.09E 00	2.73E-02	7.35E-03	9.21E-02	2.00E-04	2.37E-01	6.27E-01	2.60E-04	2.00E-07	9.66E 01	2.13E 02
1.0E 02	4.73E-03	2.03E 00	5.03E-02	7.35E-03	9.21E-02	2.60E-04	2.37E-01	6.49E-01	2.60E-04	2.00E-07	7.39E 01	2.13E 02
2.0E 02	1.83E-03	4.03E 00	9.93E-02	7.35E-03	9.21E-02	2.01E-04	2.36E-01	6.93E-01	2.61E-04	2.01E-07	4.56E 01	2.13E 02
5.0E 02	1.09E-03	9.93E 00	2.47E-01	7.30E-03	9.21E-02	2.02E-04	2.35E-01	7.80E-01	2.62E-04	2.02E-07	1.70E 01	2.13E 02
1.0E 03	1.03E-03	1.93E 01	4.93E-01	7.37E-03	9.21E-02	2.04E-04	2.32E-01	8.04E-01	2.64E-04	2.04E-07	9.70E-01	2.12E 02
2.0E 03	9.21E-02	3.67E 01	9.80E-01	7.41E-03	9.21E-02	2.07E-04	2.24E-01	9.27E-01	2.67E-04	2.07E-07	5.19E-07	2.11E 02
5.0E 03	9.21E-02	7.49E 01	2.43E 00	7.84E-03	9.21E-02	2.18E-04	2.14E-01	9.73E-01	2.78E-04	2.78E-07	1.48E-19	2.03E 02
1.0E 04	9.21E-02	1.47E 02	4.72E 00	8.20E-03	9.21E-02	2.40E-04	1.93E-01	1.01E 00	2.90E-04	2.90E-07	1.48E-40	2.04E 02
2.0E 04	9.21E-02	1.71E 02	8.63E 00	9.85E-03	9.21E-02	3.11E-04	1.53E-01	1.05E 00	3.31E-04	3.31E-07	0.0	1.95E 02
5.0E 04	9.21E-02	1.78E 02	1.88E 01	1.37E-02	9.21E-02	8.99E-04	8.90E-02	1.07E 00	4.34E-04	4.34E-07	0.0	1.72E 02
1.0E 05	9.21E-02	1.49E 02	2.96E 01	1.86E-02	9.21E-02	5.99E-04	4.93E-02	1.06E 00	5.99E-04	5.99E-07	0.0	1.39E 02
5.0E 05	9.21E-02	2.71E 01	1.49E 01	1.70E-02	9.22E-02	1.66E-03	1.70E-02	4.30E-01	1.66E-03	1.66E-06	0.0	2.59E 01
1.0E 06	9.21E-02	3.93E 00	5.14E 00	1.70E-02	9.22E-02	1.66E-03	1.70E-02	7.91E-01	1.94E-03	1.94E-06	0.0	3.74E 00
1.2E 07	9.27E-02	9.09E-02	2.32E-03	1.69E-02	9.24E-02	2.05E-03	1.59E-02	9.29E-02	2.26E-03	2.26E-06	0.0	4.66E-02
1.0E 08	9.27E-02	9.35E-15	2.23E-03	1.55E-02	9.27E-02	2.23E-03	1.55E-02	9.35E-15	2.23E-03	2.23E-06	0.0	9.35E-15

Table D7. Cont'd.

Curies Per Metric Ton of Heavy Metal Charged To Reactor

YEAR	U-234	U-235	U-236	U-237	U-238	U-240	NP-237	NP-239	NP-240M	PU-236	PU-238	PU-239
1.0E 00	5.17E 01	7.35E-03	3.62E-01	6.15E-01	2.60E-04	1.85E-11	6.03E-01	6.04E 02	1.85E-11	1.50E-01	1.61E 04	9.04E 00
2.0E 00	5.14E 01	7.30E-03	3.60E-01	5.87E-01	2.60E-04	2.13E-11	6.06E-01	5.99E 02	2.13E-11	1.42E-01	1.63E 04	9.72E 00
5.0E 00	5.09E 01	7.35E-03	3.62E-01	5.04E-01	2.60E-04	4.99E-11	6.04E-01	5.86E 02	4.49E-11	5.83E-02	1.59E 04	9.41E 00
1.0E 01	5.21E 01	7.35E-03	3.62E-01	4.04E-01	2.60E-04	8.41E-11	6.13E-01	6.09E 02	8.41E-11	1.73E-02	1.59E 04	9.45E 00
2.0E 01	5.23E 01	7.33E-03	3.60E-01	2.50E-01	2.60E-04	1.83E-10	6.14E-01	6.07E 02	1.83E-10	1.52E-03	1.62E 04	1.02E 01
5.0E 01	5.18E 01	7.33E-03	3.62E-01	8.10E-02	2.60E-04	3.49E-10	6.27E-01	6.25E 02	3.48E-10	1.03E-06	1.12E 04	1.10E 01
1.0E 02	5.19E 01	7.33E-03	3.61E-01	2.06E-02	2.60E-04	7.47E-10	6.49E-01	6.61E 02	7.90E-10	5.38E-12	7.82E 03	1.29E 01
2.0E 02	5.06E 01	7.33E-03	3.60E-01	1.09E-03	2.61E-04	1.57E-09	6.93E-01	6.33E 02	1.57E-09	1.47E-22	3.50E 03	1.47E 01
5.0E 02	5.73E 01	7.38E-03	3.73E-01	1.02E-03	2.60E-04	3.93E-09	7.50E-01	6.92E 02	3.93E-09	3.92E-56	3.42E 02	2.17E 01
1.0E 03	5.75E 01	7.37E-03	3.85E-01	9.70E-04	2.59E-04	7.85E-09	8.56E-01	7.49E 02	7.85E-09	0.0	7.48E 00	3.29E 01
2.0E 03	5.73E 01	7.41E-03	4.37E-01	8.98E-04	2.07E-04	1.57E-08	9.27E-01	7.25E 02	1.57E-08	0.0	9.57E-03	5.42E 01
5.0E 03	5.69E 01	7.05E-03	4.82E-01	8.99E-04	2.73E-04	3.93E-08	9.73E-01	5.92E 02	3.93E-08	0.0	3.33E-04	1.31E 02
1.0E 04	5.08E 01	6.82E-03	5.22E-01	8.90E-04	2.60E-04	7.77E-08	1.01E 00	5.51E 02	7.77E-08	0.0	6.17E-19	1.40E 02
2.0E 04	5.69E 01	6.49E-03	5.72E-01	1.99E-04	3.31E-04	1.59E-07	1.05E 00	1.42E 02	1.56E-07	0.0	1.51E-34	1.66E 02
5.0E 04	5.31E 01	1.37E-02	6.13E-01	1.60E-05	4.34E-04	3.77E-07	1.07E 00	4.30E 03	3.76E-07	0.0	0.0	4.40E 01
1.0E 05	4.36E 01	1.82E-02	6.13E-01	2.46E-07	5.76E-04	7.12E-07	1.08E 00	1.01E-01	7.12E-07	0.0	0.0	2.37E 01
2.0E 05	1.49E 01	1.70E-02	6.03E-01	8.92E-22	1.90E-03	2.47E-06	9.80E-01	1.71E-04	2.47E-06	0.0	0.0	4.33E-04
5.0E 05	3.69E 00	1.73E-02	5.94E-01	3.98E-90	1.47E-03	9.41E-06	7.91E-01	1.04E-04	9.41E-06	0.0	0.0	1.54E-04
1.0E 06	2.62E-03	1.09E-02	5.84E-01	0.0	2.23E-03	3.80E-05	6.47E-02	1.15E-04	3.84E-05	0.0	0.0	1.15E-04
1.0E 08	2.23E-03	1.09E-02	3.87E-02	0.0	2.23E-03	1.73E-06	9.83E-15	2.55E-06	1.73E-06	0.0	0.0	2.55E-06

YEAR	PU-242	PU-241	PU-242	PU-243	PU-244	AM-241	AM-242M	AM-242	AM-243	AM-244	AM-245	CM-242
1.0E 00	6.61E 01	2.53E 04	2.39E 01	1.73E-04	1.33E-11	6.42E 02	3.13E 01	3.13E 01	6.69E 02	1.78E-14	2.55E-05	6.44E 04
2.0E 00	1.14E 02	2.44E 04	2.34E 01	1.73E-04	2.14E-11	7.30E 02	3.09E 01	3.09E 01	8.09E 02	2.78E-14	1.14E-05	1.36E 04
5.0E 00	1.98E 02	2.12E 04	2.34E 01	1.73E-04	4.49E-11	8.35E 02	3.04E 01	3.04E 01	8.66E 02	5.84E-14	1.01E-06	1.54E 02
1.0E 01	3.17E 02	1.57E 04	2.34E 01	1.73E-04	8.97E-11	9.83E 02	2.99E 01	2.99E 01	8.88E 02	1.03E-13	1.83E-08	2.49E 01
2.0E 01	4.88E 02	1.04E 04	2.34E 01	1.73E-04	1.83E-10	1.16E 03	2.84E 01	2.84E 01	8.67E 02	2.12E-13	5.66E-12	2.33E 01
5.0E 01	7.60E 02	2.59E 03	2.34E 01	1.73E-04	3.90E-10	1.38E 03	2.66E 01	2.66E 01	8.65E 02	5.16E-13	1.77E-22	2.03E 01
1.0E 02	8.60E 02	2.76E 02	2.34E 01	1.73E-04	7.41E-10	1.35E 03	1.97E 01	1.97E 01	8.61E 02	1.03E-12	5.40E-90	1.62E 01
2.0E 02	9.69E 02	9.55E 01	2.34E 01	1.73E-04	1.48E-09	1.16E 03	1.25E 01	1.25E 01	8.53E 02	2.05E-12	0.0	1.03E 01
5.0E 02	9.49E 02	9.23E 01	2.34E 01	1.73E-04	3.93E-09	7.36E 02	3.18E 00	3.18E 00	8.30E 02	5.11E-12	0.0	2.61E 00
1.0E 03	8.01E 02	9.03E 01	2.34E 01	1.73E-04	7.86E-09	3.33E 02	3.20E-01	3.20E-01	7.99E 02	1.02E-11	0.0	2.67E-01
2.0E 03	7.23E 02	8.75E 01	2.34E 01	1.73E-04	1.57E-08	1.02E 02	3.40E-03	3.40E-03	7.25E 02	2.04E-11	0.0	2.79E-03
5.0E 03	5.31E 02	8.41E 01	2.34E 01	1.73E-04	3.91E-08	3.09E 01	3.90E-09	3.90E-09	5.52E 02	5.08E-11	0.0	3.19E-09
1.0E 04	3.13E 02	1.82E 01	2.34E 01	1.73E-04	7.73E-08	2.03E 01	4.88E-19	4.88E-19	3.51E 02	1.01E-10	0.0	4.00E-19
2.0E 04	1.14E 02	3.20E 00	2.27E 01	1.73E-04	1.54E-07	8.24E 00	7.56E-39	7.62E-39	1.42E 02	2.00E-10	0.0	6.27E-39
5.0E 04	5.26E 01	6.49E-01	2.17E 01	1.73E-04	3.78E-07	6.04E-01	0.0	0.0	9.36E 00	4.80E-10	0.0	0.0
1.0E 05	3.12E-02	1.01E-02	1.93E 01	1.73E-04	7.15E-07	1.01E-02	0.0	0.0	1.01E-01	9.27E-10	0.0	0.0
5.0E 05	2.49E-05	2.71E-17	9.34E 00	1.71E-04	2.49E-06	2.86E-17	0.0	0.0	1.71E-04	3.29E-09	0.0	0.0
1.0E 06	3.41E-06	1.86E-35	3.86E 00	1.68E-04	3.41E-06	1.73E-35	0.0	0.0	1.68E-04	4.99E-09	0.0	0.0
1.0E 07	3.68E-06	0.0	2.71E-07	1.13E-04	3.68E-06	0.0	0.0	0.0	1.15E-04	4.79E-09	0.0	0.0
1.0E 08	1.73E-06	0.0	0.0	2.55E-06	1.73E-06	0.0	0.0	0.0	2.55E-06	2.23E-09	0.0	0.0

Table D7. Cont'd.

Curies Per Metric Ton of Heavy Metal Charged To Reactor

YEAR	CM-243	CM-244	CM-245	CM-246	CM-247	CM-248	CM-249	CM-250	BK-247	BK-250	CF-249	CF-250
1.0E 00	1.7[illegible] 02	2.44E 05	4.42E 01	3.10E 01	1.73E-04	1.02E-03	4.23E-13	4.70E-10	1.70E 00	4.70E-10	1.03E-02	8.66E-02
2.0E 00	1.7[illegible] 02	2.88E 05	4.42E 01	3.10E 01	1.73E-04	1.02E-03	2.81E-19	4.69E-10	7.58E-01	4.69E-10	1.23E-02	8.21E-02
5.0E 00	1.[illegible]3E 02	2.57E 05	4.42E 01	3.10E 01	1.73E-04	1.02E-03	8.46E-38	4.69E-10	6.75E-02	4.69E-10	1.39E-02	7.00E-02
1.0E 01	1.40E 02	2.12E 05	4.42E 01	3.10E 01	1.73E-04	1.02E-03	0.0	4.69E-10	1.20E-03	4.69E-10	1.39E-02	5.37E-02
2.0E 01	1.13E 02	1.45E 05	4.42E 01	3.10E 01	1.73E-04	1.02E-03	0.0	4.69E-10	3.77E-07	4.69E-10	1.37E-02	3.16E-02
5.0E 01	6.13E 01	4.53E 04	4.41E 01	3.10E 01	1.73E-04	1.02E-03	0.0	4.69E-10	1.18E-17	4.69E-10	1.29E-02	6.45E-03
1.0E 02	2.33E 01	5.75E 03	4.39E 01	3.11E 01	1.73E-04	1.02E-03	0.0	4.68E-10	3.69E-35	4.68E-10	1.17E-02	4.50E-04
2.0E 02	2.38E 00	1.47E 02	4.35E 01	3.07E 01	1.73E-04	1.02E-03	0.0	4.66E-10	0.0	4.66E-10	9.56E-03	2.23E-06
5.0E 02	3.59E-03	1.50E-03	4.24E 01	2.93E 01	1.73E-04	1.02E-03	0.0	4.60E-10	0.0	4.60E-10	5.31E-03	4.61E-10
1.0E 03	7.09E-08	1.72E-11	4.07E 01	2.73E 01	1.73E-04	1.02E-03	0.0	4.51E-10	0.0	4.51E-10	1.99E-03	4.52E-10
2.0E 03	2.77E-17	2.04E-11	3.74E 01	2.35E 01	1.73E-04	1.02E-03	0.0	4.34E-10	0.0	4.34E-10	2.77E-04	4.34E-10
5.0E 03	1.65E-45	5.08E-11	2.91E 01	1.51E 01	1.73E-04	1.01E-03	0.0	3.85E-10	0.0	3.85E-10	7.52E-07	3.85E-10
1.0E 04	0.0	1.01E-10	1.91E 01	7.23E 00	1.73E-04	1.00E-03	0.0	3.15E-10	0.0	3.15E-10	3.98E-11	3.15E-10
2.0E 04	0.0	2.00E-10	8.27E 00	1.60E 00	1.73E-04	9.84E-04	0.0	2.12E-10	0.0	2.12E-10	1.11E-19	2.12E-10
5.0E 04	0.0	4.85E-10	5.38E-01	2.01E-02	1.73E-04	9.28E-04	0.0	6.41E-11	0.0	6.41E-11	2.44E-45	6.41E-11
1.0E 05	0.0	9.27E-10	1.01E-02	1.23E-05	1.73E-04	8.41E-04	0.0	8.74E-12	0.0	8.74E-12	0.0	8.74E-12
5.0E 05	0.0	3.24E-09	2.71E-17	1.09E-10	1.71E-04	5.02E-04	0.0	1.05E-10	0.0	1.05E-10	0.0	1.05E-10
1.0E 06	0.0	4.44E-09	1.55E-35	1.13E-14	1.68E-04	1.43E-04	0.0	0.0	0.0	1.10E-14	0.0	1.10E-14
1.0E 07	0.0	4.79E-09	0.0	0.0	1.13E-04	2.87E-12	0.0	0.0	0.0	0.0	0.0	0.0
1.0E 08	0.0	2.25E-09	0.0	0.0	2.55E-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0

YEAR	CF-251	CF-252	CF-253	CF-254	ES-253
1.0E 00	7.99E-04	2.57E-01	1.35E-10	1.24E-07	1.45E-08
2.0E 00	7.99E-04	2.00E-01	9.00E-17	1.84E-09	7.64E-14
5.0E 00	7.97E-04	9.10E-02	2.72E-35	6.51E-15	9.50E-30
1.0E 01	7.94E-04	2.45E-02	0.0	0.0	2.96E-56
2.0E 01	7.88E-04	1.77E-03	0.0	0.0	0.0
5.0E 01	7.73E-04	5.90E-07	0.0	0.0	0.0
1.0E 02	7.41E-04	1.41E-12	0.0	0.0	0.0
2.0E 02	6.86E-04	5.91E-24	0.0	0.0	0.0
5.0E 02	5.44E-04	4.35E-58	0.0	0.0	0.0
1.0E 03	3.70E-04	0.0	0.0	0.0	0.0
2.0E 03	1.71E-04	0.0	0.0	0.0	0.0
5.0E 03	1.70E-05	0.0	0.0	0.0	0.0
1.0E 04	3.61E-07	0.0	0.0	0.0	0.0
2.0E 04	1.63E-10	0.0	0.0	0.0	0.0
5.0E 04	1.50E-20	0.0	0.0	0.0	0.0
1.0E 05	2.83E-37	0.0	0.0	0.0	0.0
5.0E 05	0.0	0.0	0.0	0.0	0.0
1.0E 06	0.0	0.0	0.0	0.0	0.0
1.0E 07	0.0	0.0	0.0	0.0	0.0
1.0E 08	0.0	0.0	0.0	0.0	0.0

Table D8. Significant Actinide Activity From HTGR Plutonium Fuel Cycle - High Level Waste

Curies Per Kilogram of Actinides In High Level Waste

YEAR	TL-207	TL-208	TL-209	PB-209	PB-210	PB-211	PB-212	PB-214	BI-210	BI-211	BI-212	BI-213
1.0E 00	1.10E-08	1.93E-02	1.23E-06	5.59E-05	1.07E-08	1.17E-03	5.51E-02	2.23E-07	1.67E-08	1.17E-03	5.51E-02	5.59E-05
2.0E 00	1.53E-08	2.09E-02	1.53E-06	8.96E-05	2.39E-08	1.53E-03	5.80E-02	2.24E-07	2.34E-08	1.53E-03	5.80E-02	6.96E-05
5.0E 00	2.54E-08	2.23E-02	2.41E-06	1.10E-04	4.25E-08	2.55E-03	6.12E-02	2.28E-07	4.25E-08	2.55E-03	6.12E-02	1.10E-04
1.0E 01	4.03E-08	2.16E-02	3.87E-06	1.77E-04	7.13E-08	4.05E-03	6.00E-02	2.36E-07	7.13E-08	4.05E-03	6.00E-02	1.77E-04
2.0E 01	6.33E-08	1.49E-02	6.34E-06	3.11E-04	1.21E-07	6.40E-03	5.43E-02	2.62E-07	1.21E-07	6.40E-03	5.43E-02	3.11E-04
5.0E 01	1.02E-07	1.45E-02	1.57E-05	7.13E-04	2.59E-07	1.02E-02	4.04E-02	4.13E-07	2.59E-07	1.02E-02	4.04E-02	7.13E-04
1.0E 02	1.21E-07	9.00E-03	3.08E-05	1.38E-03	6.32E-07	1.21E-02	2.50E-02	9.44E-07	6.32E-07	1.21E-02	2.50E-02	1.38E-03
2.0E 02	1.42E-07	3.45E-03	5.93E-05	2.70E-03	2.49E-06	1.42E-02	9.57E-03	3.47E-06	2.49E-06	1.42E-02	9.57E-03	2.70E-03
5.0E 02	1.25E-07	2.08E-04	1.49E-04	6.83E-03	1.89E-05	1.25E-02	5.74E-04	2.14E-05	1.89E-05	1.25E-02	5.79E-04	6.60E-03
1.0E 03	1.23E-07	1.32E-05	2.82E-04	1.23E-02	8.23E-05	1.24E-02	5.33E-05	8.74E-05	8.23E-05	1.24E-02	5.33E-05	1.28E-02
2.0E 03	1.21E-07	1.75E-05	5.30E-04	2.44E-02	3.25E-04	1.21E-02	4.90E-05	3.25E-04	3.25E-04	1.21E-02	4.90E-05	2.44E-02
5.0E 03	1.13E-07	1.70E-05	1.17E-03	5.31E-02	1.49E-03	1.13E-02	4.90E-05	1.49E-03	1.43E-03	1.13E-02	4.90E-05	5.31E-02
1.0E 04	1.06E-07	1.70E-05	1.68E-03	8.53E-02	3.82E-03	1.02E-02	4.90E-05	3.82E-03	3.82E-03	1.02E-02	4.90E-05	8.53E-02
2.0E 04	8.49E-08	1.70E-05	2.55E-03	1.10E-01	8.33E-03	8.23E-03	4.90E-05	8.33E-03	8.33E-03	8.20E-03	4.90E-05	1.10E-01
5.0E 04	4.49E-08	1.77E-05	2.70E-03	1.23E-01	1.90E-02	4.48E-03	4.90E-05	1.90E-02	1.90E-02	4.49E-03	4.90E-05	1.25E-01
1.0E 05	1.61E-08	1.77E-05	2.49E-03	1.11E-01	2.95E-02	1.81E-03	4.91E-05	2.98E-02	2.98E-02	1.82E-03	4.91E-05	1.11E-01
5.0E 05	5.01E-09	1.78E-05	1.25E-03	5.70E-02	2.10E-02	5.02E-04	4.93E-05	2.10E-02	2.10E-02	5.02E-04	4.93E-05	5.70E-02
1.0E 06	5.00E-09	1.79E-05	8.79E-04	4.05E-02	5.49E-03	5.02E-04	4.95E-05	5.49E-03	5.45E-03	5.02E-04	4.96E-05	4.05E-02
1.0E 07	4.99E-09	1.95E-05	4.53E-05	2.03E-03	3.03E-06	4.93E-04	5.44E-05	3.03E-06	3.03E-06	4.98E-04	5.44E-05	2.06E-03
1.0E 08	4.54E-09	2.49E-05	9.13E-14	4.10E-10	2.90E-06	4.55E-04	6.91E-05	2.90E-06	2.90E-06	4.56E-04	6.91E-05	4.15E-10

YEAR	BI-214	PO-210	PO-211	PO-212	PO-213	PO-214	PO-215	PO-216	PO-218	AT-217	RN-219	RN-220
1.0E 00	2.23E-07	1.29E-08	3.50E-06	3.53E-02	5.47E-05	2.23E-07	1.17E-03	5.51E-02	2.23E-07	5.59E-05	1.17E-03	5.51E-02
2.0E 00	2.24E-07	1.49E-08	4.53E-06	3.71E-02	5.78E-05	2.24E-07	1.53E-03	5.80E-02	2.24E-07	6.96E-05	1.53E-03	5.80E-02
5.0E 00	2.28E-07	3.30E-08	7.65E-06	3.96E-02	1.07E-04	2.28E-07	2.55E-03	6.12E-02	2.28E-07	1.10E-04	2.55E-03	6.12E-02
1.0E 01	2.36E-07	5.73E-08	1.61E-05	4.44E-02	1.73E-04	2.36E-07	4.05E-03	6.00E-02	2.36E-07	1.77E-04	4.05E-03	6.00E-02
2.0E 01	2.62E-07	1.21E-07	1.92E-05	3.47E-02	3.04E-04	2.62E-07	6.40E-03	5.43E-02	2.62E-07	3.11E-04	6.40E-03	5.43E-02
5.0E 01	4.13E-07	2.53E-07	3.08E-05	2.59E-02	8.97E-04	4.13E-07	1.02E-02	4.04E-02	4.13E-07	7.13E-04	1.02E-02	4.04E-02
1.0E 02	8.48E-07	5.32E-07	3.59E-05	1.80E-02	1.93E-03	9.48E-07	1.21E-02	2.50E-02	9.48E-07	1.38E-03	1.21E-02	2.50E-02
2.0E 02	3.27E-06	2.45E-06	3.77E-05	8.11E-03	4.09E-03	3.27E-06	1.20E-02	9.57E-03	3.27E-06	2.70E-03	1.20E-02	9.57E-03
5.0E 02	2.14E-05	1.49E-05	3.73E-05	3.71E-04	4.93E-03	2.14E-05	1.25E-02	5.73E-04	2.14E-05	6.60E-03	1.25E-02	5.79E-04
1.0E 03	8.74E-05	8.23E-05	3.71E-05	3.41E-05	1.20E-02	8.74E-05	1.24E-02	5.33E-05	8.74E-05	1.28E-02	1.24E-02	5.33E-05
2.0E 03	3.25E-04	3.25E-04	3.63E-05	3.19E-05	2.39E-02	3.23E-04	1.21E-02	4.90E-05	3.25E-04	2.44E-02	1.21E-02	4.90E-05
5.0E 03	1.48E-03	1.49E-03	3.41E-05	3.14E-05	5.14E-02	1.49E-03	1.13E-02	4.90E-05	1.48E-03	5.31E-02	1.13E-02	4.90E-05
1.0E 04	3.82E-03	3.82E-03	3.20E-05	3.19E-05	8.39E-02	3.82E-03	1.02E-02	4.90E-05	3.82E-03	8.53E-02	1.02E-02	4.90E-05
2.0E 04	8.33E-03	8.33E-03	2.64E-05	3.19E-05	1.10E-01	8.33E-03	8.26E-03	4.90E-05	8.33E-03	1.10E-01	8.26E-03	4.90E-05
5.0E 04	1.90E-02	1.90E-02	1.38E-05	3.19E-05	1.04E-01	1.90E-02	1.92E-03	4.91E-05	1.90E-02	1.23E-01	4.49E-03	4.90E-05
1.0E 05	2.98E-02	2.98E-02	5.42E-06	3.18E-05	1.04E-01	2.98E-02	4.49E-03	4.90E-05	2.98E-02	1.11E-01	1.82E-03	4.91E-05
5.0E 05	2.10E-02	2.10E-02	1.51E-06	3.18E-05	9.97E-02	2.10E-02	5.02E-04	4.93E-05	2.10E-02	5.70E-02	5.02E-04	4.93E-05
1.0E 06	5.49E-03	5.49E-03	1.51E-06	3.18E-05	5.49E-02	5.49E-03	5.02E-04	4.96E-05	5.49E-03	4.05E-02	5.02E-04	4.96E-05
1.0E 07	3.03E-06	3.03E-06	1.49E-06	3.49E-05	2.06E-03	3.03E-06	4.93E-04	5.44E-05	3.03E-06	2.06E-03	4.93E-04	5.44E-05
1.0E 08	2.90E-06	2.90E-06	1.37E-06	4.42E-05	4.15E-10	2.90E-06	4.55E-04	6.91E-05	2.90E-06	4.15E-10	4.56E-04	6.91E-05

Table D8. Cont'd.

Curies Per Kilogram of Actinides In High Level Waste

Years	Pa-232	Pa-231	Pa-233	Th-231	Th-232	Th-234	Pa-231	Pa-233	Pa-233M	Pa-234	U-234	U-233
1.0E 00	5.94E-32	3.59E-03	2.65E-06	3.91E-06	0.90E-03	1.99E-06	1.26E-02	6.26E-03	1.99E-06	1.97E-06	6.30E-02	1.41E-01
2.0E 00	5.78E-32	9.43E-03	2.99E-06	3.91E-06	0.90E-03	1.38E-07	1.26E-02	3.27E-02	1.38E-07	1.39E-10	6.29E-02	1.41E-01
5.0E 00	6.13E-32	1.10E-02	3.5BE-06	3.91E-06	0.90E-03	1.38E-07	1.29E-02	3.24E-02	1.38E-07	1.38E-10	6.06E-02	1.41E-01
1.0E 01	5.44E-32	1.77E-02	4.34E-06	3.91E-06	0.90E-03	1.38E-07	1.26E-02	3.24E-02	1.38E-07	1.38E-10	5.77E-02	1.41E-01
2.0E 01	5.92E-32	3.14E-02	7.52E-06	3.91E-06	0.90E-03	1.38E-07	1.26E-02	3.25E-02	1.38E-07	1.38E-10	5.29E-02	1.41E-01
5.0E 01	6.08E-32	7.13E-02	1.93E-05	3.91E-06	0.90E-03	1.38E-07	1.26E-02	3.29E-02	1.38E-07	1.38E-10	3.93E-02	1.41E-01
1.0E 02	2.95E-32	1.38E-01	3.80E-05	3.92E-06	0.90E-03	1.38E-07	1.26E-02	3.34E-02	1.38E-07	1.38E-10	2.43E-02	1.41E-01
2.0E 02	9.57E-33	2.47E-01	7.73E-05	3.96E-06	0.90E-03	1.39E-07	1.26E-02	3.43E-02	1.39E-07	1.39E-10	9.22E-03	1.41E-01
5.0E 02	5.75E-34	5.60E-01	2.20E-04	4.07E-06	0.90E-03	1.39E-07	1.25E-02	3.63E-02	1.39E-07	1.39E-10	5.16E-04	1.41E-01
1.0E 03	5.38E-35	1.23E-02	6.80E-04	6.50E-06	0.90E-03	1.40E-07	1.24E-02	3.83E-02	1.40E-07	1.40E-10	4.17E-06	1.41E-01
2.0E 03	0.90E-35	2.99E-02	1.33E-03	0.81E-06	0.90E-03	1.43E-07	1.21E-02	4.31E-02	1.43E-07	1.43E-10	2.76E-10	1.41E-01
5.0E 03	0.90E-35	5.31E-02	2.93E-03	1.76E-05	0.90E-03	1.53E-07	1.13E-02	6.21E-02	1.53E-07	1.53E-10	7.49E-23	1.39E-01
1.0E 04	0.90E-35	9.03E-02	6.91E-03	6.76E-05	0.90E-03	1.73E-07	1.02E-02	9.42E-02	1.73E-07	1.73E-10	9.75E-44	1.37E-01
2.0E 04	0.90E-35	1.46E-01	9.32E-03	1.29E-04	0.90E-03	2.19E-07	8.25E-03	9.64E-02	2.19E-07	2.19E-10	0.0	1.33E-01
5.0E 04	0.90E-35	1.23E-01	1.47E-02	3.29E-04	0.90E-03	3.65E-07	4.67E-03	4.76E-02	3.64E-07	3.64E-10	0.0	1.23E-01
1.0E 05	0.91E-35	1.11E-01	2.44E-02	0.60E-04	0.91E-03	5.90E-07	1.81E-03	0.70E-02	5.90E-07	5.90E-10	0.0	1.08E-01
5.0E 05	0.93E-35	5.70E-02	2.04E-02	5.04E-04	0.93E-03	1.81E-06	5.02E-04	1.13E-02	1.81E-06	1.81E-09	0.0	5.51E-02
1.0E 06	0.95E-35	0.33E-02	5.34E-03	5.02E-04	0.90E-03	2.49E-06	5.02E-04	1.51E-02	2.49E-06	2.49E-09	0.0	3.92E-02
1.0E 07	5.99E-35	2.03E-03	3.03E-06	0.90E-04	0.99E-03	2.49E-06	0.90E-04	1.90E-03	2.49E-06	2.49E-09	0.0	2.06E-03
1.0E 08	6.91E-35	0.13E-16	2.49E-06	0.50E-04	0.91E-03	2.49E-06	4.50E-04	0.15E-16	2.90E-06	2.90E-09	0.0	0.15E-16

Table D8. Cont'd.

Curies Per Kilogram of Actinides In High Level Waste

YEAR	U-234	U-235	U-236	U-237	U-238	U-240	NP-237	NP-239	NP-240M	PU-236	PU-238	PU-239
1.0E 00	2.7[illegible]-32	3.41E-36	1.42E-34	3.3[illegible]-05	1.38E-07	9.20E-13	3.23E-02	9.62E 01	9.20E-13	8.21E-05	7.16E 01	8.72E-03
2.0E 00	2.7[illegible]-32	3.41E-36	1.42E-34	3.17E-05	1.38E-07	8.30E-13	3.23E-02	9.62E 01	8.30E-13	8.49E-05	8.45E 01	8.30E-03
5.0E 00	2.68[illegible]-32	3.41E-36	1.43E-34	2.83E-05	1.38E-07	2.04E-12	3.24E-02	9.62E 01	2.09E-12	3.10E-05	8.62E 01	1.30E-02
1.0E 01	2.64E-32	3.41E-36	1.44E-34	2.35E-05	1.38E-07	9.17E-12	3.24E-02	9.62E 01	9.17E-12	9.23E-06	8.29E 01	2.07E-02
2.0E 01	3.23E-32	3.41E-36	2.03E-34	1.07E-05	1.38E-07	8.35E-12	3.25E-02	9.61E 01	8.35E-12	8.08E-07	7.68E 01	3.54E-02
5.0E 01	3.78E-32	3.41E-36	2.23E-34	8.31E-05	1.38E-07	2.04E-11	3.27E-02	9.60E 01	2.04E-11	3.47E-10	6.11E 01	7.89E-02
1.0E 02	4.49E-32	3.42E-36	2.34E-34	8.40E-05	1.38E-07	9.17E-11	3.28E-02	9.58E 01	9.17E-11	2.80E-15	4.17E 01	1.47E-01
2.0E 02	5.31E-32	3.44E-36	2.46E-34	8.57E-05	1.38E-07	8.35E-11	3.29E-02	9.56E 01	8.35E-11	7.84E-26	1.95E 01	2.77E 01
5.0E 02	5.47E-32	3.47E-36	2.47E-34	8.65E-05	1.38E-07	2.04E-10	3.03E-02	9.62E 01	2.09E-10	1.59E-57	2.09E 00	6.55E-01
1.0E 03	5.53E-32	3.59E-36	2.49E-34	8.72E-05	1.38E-07	9.17E-10	3.93E-02	9.22E 01	9.17E-10	0.0	7.03E-02	1.25E 00
2.0E 03	5.91E-32	3.81E-36	2.69E-34	9.78E-05	1.43E-07	8.35E-10	4.01E-02	8.45E 01	8.35E-10	0.0	3.73E-04	2.35E 00
5.0E 03	5.96E-32	1.72E-35	5.22E-34	3.72E-05	1.55E-07	2.08E-09	4.21E-02	2.94E 01	2.08E-09	0.0	1.77E-10	4.91E 00
1.0E 04	5.96E-32	6.77E-35	1.01E-33	2.90E-05	1.73E-07	9.13E-09	4.42E-02	1.07E 01	9.13E-09	0.0	2.22E-20	7.37E 00
2.0E 04	5.82E-32	1.24E-34	1.11E-33	1.06E-05	2.14E-07	8.19E-09	4.64E-02	7.56E 00	8.19E-09	0.0	8.06E-40	8.52E 00
5.0E 04	5.45E-32	1.24E-34	1.23E-33	9.59E-07	3.06E-07	1.44E-08	4.70E-02	4.99E-01	1.99E-08	0.0	0.0	9.89E 00
1.0E 05	4.03E-32	9.03E-34	1.27E-32	1.29E-08	3.42E-07	3.77E-08	4.73E-02	5.37E-03	3.79E-08	0.0	0.0	1.23E 00
5.0E 05	1.64E-32	5.22E-34	1.25E-32	3.07E-09	1.31E-06	1.32E-07	9.13E-02	9.12E-05	1.32E-07	0.0	0.0	2.27E-03
1.0E 06	3.05E-33	9.02E-34	1.24E-32	2.16E-11	2.49E-06	1.41E-07	3.51E-02	8.93E-06	1.41E-07	0.0	0.0	8.21E-06
1.0E 07	2.79E-34	4.93E-34	9.52E-33	0.0	2.49E-06	1.43E-07	1.43E-03	6.10E-06	1.43E-07	0.0	0.0	6.10E-06
1.0E 08	2.93E-36	4.86E-34	7.33E-34	0.0	2.49E-06	9.22E-08	4.15E-16	1.36E-07	9.22E-08	0.0	0.0	1.36E-07

YEAR	PU-240	PU-241	PU-242	PU-243	PU-244	AM-241	AM-242M	AM-242	AM-243	AM-244	AM-245	CM-242
1.0E 00	1.59E 00	1.07E 01	1.29E-02	9.31E-06	9.20E-13	3.93E 01	1.05E 00	1.05E 00	9.62E 01	9.40E-16	1.30E-06	3.93E 01
2.0E 00	1.59E 00	1.07E 01	1.29E-02	9.31E-06	8.30E-13	3.93E 01	1.04E 00	1.04E 00	9.62E 01	1.09E-15	6.05E-07	7.26E 02
5.0E 00	1.59E 00	1.08E 01	1.29E-02	9.31E-06	2.07E-12	3.94E 01	1.02E 00	1.02E 00	9.62E 01	2.72E-15	5.39E-08	8.19E 00
1.0E 01	1.60E 01	1.07E 01	1.29E-02	9.31E-06	9.18E-12	3.93E 01	1.54E 00	1.54E 00	9.62E 01	9.93E-15	9.56E-10	1.30E 00
2.0E 01	2.17E 01	5.07E 00	1.23E-02	9.31E-06	8.30E-12	3.38E 01	1.51E 00	1.51E 00	9.61E 01	1.09E-14	3.31E-13	1.29E 00
5.0E 01	3.70E 01	3.60E 00	1.25E-02	9.31E-06	2.07E-11	3.25E 01	1.32E 00	1.32E 00	9.60E 01	2.72E-14	9.39E-24	1.08E 00
1.0E 02	4.33E 01	2.49E 00	1.27E-02	9.31E-06	9.18E-11	3.02E 01	1.35E 00	1.35E 00	9.58E 01	9.93E-14	2.93E-41	8.61E-01
2.0E 02	4.83E 01	2.32E 00	1.31E-02	9.31E-06	8.30E-11	2.81E 01	6.65E-01	6.65E-01	9.56E 01	1.09E-13	0.0	9.46E-01
5.0E 02	4.22E 01	2.10E 00	1.39E-02	9.31E-06	2.07E-10	1.78E 01	1.64E-01	1.09E-01	9.42E 01	2.72E-13	0.0	1.39E-01
1.0E 03	4.01E 01	2.17E 00	1.56E-02	9.31E-06	9.18E-10	8.85E 00	1.73E-02	1.73E-02	9.22E 01	9.93E-13	0.0	1.42E-02
2.0E 03	3.62E 01	1.64E 00	1.78E-02	9.31E-06	8.30E-10	3.94E 00	1.41E-04	1.41E-04	8.85E 01	1.00E-12	0.0	1.44E-04
5.0E 03	2.66E 01	1.09E 00	2.33E-02	9.31E-06	2.06E-09	1.04E 00	2.07E-10	2.07E-10	2.99E 01	2.70E-12	0.0	1.70E-10
1.0E 04	1.59E 01	1.02E 00	2.63E-02	9.31E-06	9.14E-09	1.06E 00	2.60E-20	2.60E-20	1.87E 01	9.36E-12	0.0	2.13E-20
2.0E 04	5.71E 00	9.60E-01	3.14E-02	9.31E-06	8.20E-09	9.41E-01	9.03E-40	9.03E-40	7.56E 00	1.07E-11	0.0	3.33E-40
5.0E 04	6.09E-01	3.05E-02	3.07E-02	9.31E-06	1.99E-08	3.39E-02	0.0	0.0	6.98E-01	2.54E-11	0.0	0.0
1.0E 05	1.30E-03	3.37E-04	2.31E-02	9.31E-06	3.97E-08	3.37E-04	0.0	0.0	5.37E-03	6.93E-11	0.0	0.0
5.0E 05	1.83E-07	1.04E-13	1.85E-02	9.31E-06	1.93E-07	1.92E-10	0.0	0.0	9.12E-06	1.72E-10	0.0	0.0
1.0E 06	1.82E-07	9.95E-17	5.04E-03	9.31E-06	1.82E-07	9.33E-17	0.0	0.0	8.93E-06	2.30E-10	0.0	0.0
1.0E 07	1.90E-07	0.0	3.89E-10	9.31E-06	1.60E-07	0.0	0.0	0.0	6.10E-06	6.55E-10	0.0	0.0
1.0E 08	9.23E-08	0.0	0.0	1.30E-07	9.23E-08	0.0	0.0	0.0	1.36E-07	1.20E-10	0.0	0.0

Table D8. Cont'd

Curies Per Kilogram of Actinides In High Level Waste

YEAR	CM-243	CM-244	CM-245	CM-246	CM-247	CM-248	CM-249	CM-250	BK-249	BK-250	CF-249	CF-250
1.0E 03	4.65E 03	1.59E 06	2.83E 03	1.60E 03	4.31E-06	5.49E-05	2.26E-13	2.50E-11	9.04E-02	2.50E-11	5.33E-04	4.81E-03
2.0E 03	4.25E 02	1.03E 06	2.83E 03	1.60E 03	4.31E-06	5.49E-05	1.53E-20	2.50E-11	9.03E-02	2.50E-11	6.56E-04	4.37E-03
5.0E 03	6.68E 00	1.02E 06	2.83E 03	1.60E 03	4.31E-06	5.49E-05	4.53E-39	2.50E-11	3.59E-03	2.50E-11	7.39E-04	3.71E-03
1.0E 04	9.78E 03	1.69E 06	2.83E 03	1.60E 03	4.31E-06	5.49E-05	0.0	2.50E-11	6.37E-03	2.50E-11	7.61E-04	2.86E-03
2.0E 04	6.26E 03	1.54E 06	2.83E 03	1.60E 03	4.31E-06	5.45E-05	0.0	2.50E-11	2.01E-04	2.50E-11	7.26E-04	1.64E-03
5.0E 04	3.71E 03	2.04E 06	2.83E 03	1.60E 03	4.31E-06	5.45E-05	0.0	2.49E-11	6.26E-19	2.49E-11	6.85E-04	3.43E-04
1.0E 05	1.11E 03	1.49E 06	2.83E 03	1.60E 03	4.31E-06	5.49E-05	0.0	2.49E-11	1.94E-36	2.49E-11	6.20E-04	2.42E-05
2.0E 05	1.27E-11	7.84E 03	2.83E 03	1.60E 03	4.31E-06	5.49E-05	0.0	2.48E-11	0.0	2.48E-11	5.10E-04	1.21E-07
5.0E 05	1.91E-06	7.96E-05	2.69E 03	1.59E 03	4.31E-06	5.46E-05	0.0	2.45E-11	0.0	2.45E-11	2.82E-04	2.45E-11
1.0E 06	1.77E-06	4.03E-11	2.61E 03	1.49E 03	4.31E-06	5.49E-05	0.0	2.40E-11	0.0	2.40E-11	1.05E-04	2.40E-11
2.0E 06	1.49E-06	1.33E-14	1.44E 03	1.23E 03	4.31E-06	5.42E-05	0.0	2.31E-11	0.0	2.31E-11	1.47E-05	2.31E-11
5.0E 06	4.03E-07	2.21E-14	1.55E 03	6.05E-01	4.31E-06	5.19E-05	0.0	2.05E-11	0.0	2.05E-11	4.00E-08	2.05E-11
1.0E 07	0.0	9.59E-12	1.02E 03	3.86E-01	4.31E-06	4.94E-05	0.0	1.69E-11	0.0	1.68E-11	2.12E-12	1.68E-11
2.0E 07	0.0	1.37E-11	4.93E-01	6.89E-04	4.31E-06	4.29E-05	0.0	1.13E-11	0.0	1.13E-11	5.92E-21	1.13E-11
5.0E 07	0.0	2.09E-11	3.93E-04	1.28E-08	4.29E-06	2.88E-05	0.0	3.91E-12	0.0	3.91E-12	1.30E-46	3.91E-12
1.0E 08	0.0	4.16E-11	1.54E-07	1.64E-13	4.27E-06	8.27E-06	0.0	4.53E-13	0.0	4.53E-13	0.0	4.53E-13
2.0E 08	0.0	1.82E-10	1.96E-13	5.56E-20	4.14E-06	2.23E-05	0.0	5.59E-20	0.0	5.59E-20	0.0	5.59E-20
5.0E 08	0.0	2.86E-09	8.03E-37	0.0	3.43E-06	7.50E-06	0.0	0.0	0.0	6.17E-26	0.0	6.17E-26
1.0E 09	0.0	2.53E-10	0.0	0.0	0.0	1.92E-13	0.0	0.0	0.0	0.0	0.0	0.0
1.0E 10	0.0	1.23E-10	0.0	0.0	1.16E-37	0.0	0.0	0.0	0.0	0.0	0.0	0.0

YEAR	CF-251	CF-252	CF-253	CF-254	ES-253
1.0E 03	4.25E-35	1.33E-02	7.19E-14	6.44E-09	7.74E-10
2.0E 03	4.25E-35	1.08E-02	4.42E-18	9.01E-11	9.30E-15
5.0E 03	4.24E-35	4.38E-03	1.49E-18	3.40E-10	5.03E-31
1.0E 04	4.22E-35	1.31E-03	0.0	0.0	1.97E-57
2.0E 04	4.14E-35	4.31E-05	0.0	0.0	0.0
5.0E 04	4.07E-35	3.67E-08	0.0	0.0	0.0
1.0E 05	3.96E-35	7.51E-14	0.0	0.0	0.0
2.0E 05	3.85E-35	5.15E-23	0.0	0.0	0.0
5.0E 05	2.69E-35	2.31E-39	0.0	0.0	0.0
1.0E 06	1.47E-35	0.0	0.0	0.0	0.0
2.0E 06	9.12E-36	0.0	0.0	0.0	0.0
5.0E 06	9.09E-37	0.0	0.0	0.0	0.0
1.0E 07	1.92E-38	0.0	0.0	0.0	0.0
2.0E 07	8.65E-12	0.0	0.0	0.0	0.0
5.0E 07	4.03E-22	0.0	0.0	0.0	0.0
1.0E 08	1.51E-33	0.0	0.0	0.0	0.0
5.0E 08	0.0	0.0	0.0	0.0	0.0
1.0E 09	0.0	0.0	0.0	0.0	0.0
1.0E 10	0.0	0.0	0.0	0.0	0.0
1.0E 10	0.0	0.0	0.0	0.0	0.0

Table D9. Significant Actinide Activity From HTGR Plutonium Fuel Cycle - Recovered Uranium

Curies Per Kilogram of Recovered Uranium

YEAR	TL-207	TL-208	TL-209	PB-209	PB-210	PB-211	PB-212	PB-214	BI-210	BI-211	BI-212	BI-213
1.0E 00	5.13E-21	3.02E-01	1.03E-05	4.95E-09	2.20E-11	6.12E-11	8.89E-01	2.38E-09	2.56E-11	6.12E-11	8.89E-01	4.95E-04
2.0E 00	2.49E-19	5.46E-01	2.14E-05	9.91E-09	2.39E-10	2.44E-10	1.50E 00	9.53E-09	2.04E-10	2.44E-10	1.50E 00	9.91E-04
5.0E 00	1.47E-18	8.01E-01	3.49E-05	2.48E-08	3.13E-09	1.47E-09	2.39E 00	5.95E-08	3.13E-09	1.47E-09	2.39E 00	2.48E-03
1.0E 01	5.59E-18	9.11E-01	1.03E-04	4.95E-08	4.41E-08	5.61E-09	2.67E 00	2.38E-07	2.41E-08	5.61E-09	2.67E 00	4.95E-03
2.0E 01	2.00E-17	9.49E-01	2.13E-04	9.90E-08	1.79E-07	2.03E-08	2.69E 00	4.50E-07	1.79E-07	2.03E-08	2.69E 00	9.90E-03
5.0E 01	4.57E-17	9.71E-01	5.43E-04	2.47E-07	4.44E-06	9.70E-08	1.86E 00	5.91E-06	2.26E-06	9.70E-08	1.86E 00	2.47E-02
1.0E 02	2.70E-17	9.15E-01	1.04E-03	4.93E-07	1.39E-05	2.71E-07	1.15E 00	2.35E-05	1.34E-05	2.71E-07	1.15E 00	4.93E-02
2.0E 02	8.98E-17	1.03E-01	2.10E-03	9.81E-07	3.40E-05	8.30E-07	4.40E-01	9.26E-05	6.90E-05	8.30E-07	4.40E-01	9.81E-02
5.0E 02	1.77E-16	8.01E-03	5.31E-03	2.46E-06	1.80E-05	2.45E-06	5.56E-04	6.93E-04	1.80E-06	2.45E-06	2.42E-01	
1.0E 03	3.08E-16	7.13E-03	1.04E-02	4.71E-06	3.70E-06	1.99E-04	2.06E-03	1.95E-03	3.70E-06	1.99E-04	4.71E-01	
2.0E 03	7.53E-16	5.92E-03	1.99E-02	8.90E-06	7.23E-03	7.23E-06	1.33E-04	7.23E-03	7.23E-03	7.55E-06	1.33E-04	8.98E-01
5.0E 03	4.82E-15	7.02E-03	4.92E-02	1.49E 00	9.18E-02	1.93E-05	2.14E-03	3.14E-02	3.14E-02	1.83E-05	2.14E-04	1.95E 00
1.0E 04	3.40E-15	1.57E-04	6.95E-02	3.12E 00	8.10E-02	3.47E-05	4.37E-04	8.10E-02	8.10E-02	3.47E-05	4.37E-04	3.12E 00
2.0E 04	8.20E-15	3.46E-04	8.23E-02	4.20E 00	1.78E-01	8.26E-05	8.73E-04	1.76E 01	1.76E-01	8.26E-05	8.73E-04	4.20E 00
5.0E 04	1.19E-14	7.49E-04	4.53E-02	4.30E 00	4.00E-01	2.18E-04	2.18E-03	4.00E-01	4.00E-01	2.18E-04	2.18E-03	4.36E 00
1.0E 05	4.57E-14	1.57E-03	7.83E-02	3.50E 00	2.22E-01	1.39E-04	4.36E-04	8.22E-01	8.22E-01	1.39E-04	4.36E-04	3.56E 00
5.0E 05	1.40E-13	7.93E-03	1.48E-02	6.43E-01	4.42E-01	1.81E-04	2.17E-03	4.42E-01	4.42E-01	1.81E-04	2.17E-03	6.43E-01
1.0E 06	1.80E-13	1.33E-02	1.20E-03	7.57E-02	1.14E-01	1.40E-04	4.30E-03	1.14E-01	1.14E-01	1.80E-04	4.30E-03	7.57E-02
1.0E 07	1.75E-12	1.30E-06	2.02E-13	9.19E-12	6.70E-06	1.79E-04	3.79E-06	6.56E-06	6.56E-06	1.79E-04	3.79E-06	9.19E-12
1.0E 08	1.63E-11	5.10E-06	4.27E-20	1.83E-19	6.29E-06	1.09E-04	1.42E-05	6.29E-06	6.29E-06	1.09E-04	1.42E-05	1.65E-24

YEAR	BI-214	PO-213	PO-214	PO-215	PO-216	PO-218	AT-217	RN-219	RN-220
1.0E 00	2.38E-09	5.92E-12	1.83E-13	5.69E-01	4.89E-09	2.38E-09	6.12E-11	8.89E-01	2.38E-09	4.95E-04	6.12E-11	8.89E-01
2.0E 00	4.53E-09	1.02E-12	7.31E-13	9.63E-01	4.89E-09	9.53E-09	2.44E-10	1.50E 00	9.53E-09	4.91E-04	2.44E-10	1.50E 00
5.0E 00	5.95E-08	2.24E-09	4.63E-12	1.58E 00	2.42E-03	5.45E-08	1.47E-09	2.39E 00	5.95E-08	2.48E-03	1.47E-09	2.39E 00
1.0E 01	2.38E-07	2.03E-08	1.54E-11	1.71E 00	9.89E-03	2.38E-07	5.61E-09	2.67E 00	2.38E-07	9.45E-03	5.61E-09	2.67E 00
2.0E 01	9.50E-07	1.77E-07	6.03E-11	1.59E 00	4.65E-03	9.50E-07	2.03E-08	2.44E 00	9.50E-07	3.93E-03	2.03E-08	2.49E 00
5.0E 01	5.91E-06	2.26E-06	2.91E-10	1.19E 00	2.92E-02	5.71E-06	9.70E-08	1.86E 00	5.91E-06	2.47E-02	9.70E-08	1.86E 00
1.0E 02	2.35E-05	1.84E-05	8.12E-10	7.37E-01	9.32E-02	2.35E-05	2.71E-07	1.15E 00	2.35E-05	9.83E-02	2.71E-07	1.15E 00
2.0E 02	9.26E-05	8.03E-05	1.49E-09	2.81E-01	8.39E-02	9.26E-05	8.30E-07	4.40E-01	9.26E-05	9.61E-02	6.50E-07	4.40E-01
5.0E 02	5.54E-04	4.43E-04	5.34E-09	1.57E-02	2.30E-01	5.74E-04	1.93E-06	2.45E-02	5.54E-04	2.42E-01	1.80E-06	2.45E-02
1.0E 03	2.06E-03	1.45E-03	1.11E-08	1.27E-02	8.01E-01	2.06E-03	3.70E-06	1.99E-04	2.06E-03	4.71E-01	3.70E-06	1.99E-04
2.0E 03	7.23E-03	7.03E-03	2.23E-08	8.93E-04	2.78E-01	7.23E-03	7.55E-06	1.33E-04	7.23E-03	8.98E-01	7.55E-06	1.33E-04
5.0E 03	3.14E-02	3.14E-02	5.43E-08	1.40E-04	4.91E 00	3.18E-02	1.83E-05	2.18E-03	3.18E-02	1.95E 00	1.83E-05	2.18E-03
1.0E 04	8.10E-02	8.10E-02	1.04E-07	2.79E-04	3.05E 00	8.10E-02	3.47E-05	4.37E-04	8.10E-02	3.12E 00	3.47E-05	4.37E-04
2.0E 04	1.76E-01	1.76E-01	1.33E-07	5.59E-04	9.13E 00	1.76E-01	8.23E-05	8.73E-04	1.75E-01	4.20E 00	8.23E-05	8.73E-04
5.0E 04	4.00E-01	4.00E-01	3.50E-07	1.40E-03	6.27E 00	4.00E-01	2.18E-04	2.18E-03	4.00E-01	4.30E 00	2.18E-04	2.18E-03
1.0E 05	8.22E-01	8.22E-01	6.22E-07	2.74E-03	3.48E 00	8.22E-01	1.54E-04	4.36E-04	8.22E-01	3.50E 00	1.59E-04	4.36E-04
5.0E 05	4.42E-01	4.42E-01	5.42E-07	1.39E-03	2.22E-01	4.42E-01	1.81E-04	2.17E-03	4.42E-01	6.43E-01	1.81E-04	2.17E-03
1.0E 06	1.14E-01	1.14E-01	5.42E-07	2.73E-03	7.40E-02	1.15E-01	1.80E-04	4.30E-03	1.14E-01	7.57E-02	1.80E-04	4.30E-03
1.0E 07	6.56E-06	6.56E-06	5.37E-07	2.62E-06	3.44E-12	6.56E-06	1.79E-04	3.79E-06	6.56E-06	9.19E-12	1.79E-04	3.79E-06
1.0E 08	6.29E-06	6.29E-06	4.93E-07	9.07E-06	1.81E-24	6.29E-06	1.66E-04	1.42E-05	6.29E-06	1.65E-24	1.66E-04	1.42E-05

Table D9. Cont'd.

Curies Per Kilogram of Recovered Uranium

YEAR	RN-222	FR-221	FR-223	RA-223	RA-224	RA-225	RA-226	RA-228	AC-225	AC-227	AC-228	TH-227
1.0E 00	2.30E-04	4.95E-04	8.57E-13	8.16E-11	8.89E-01	4.95E-04	2.38E-09	2.18E-14	4.95E-04	8.12E-11	2.18E-14	6.03E-11
2.0E 00	9.53E-03	4.91E-04	3.63E-12	2.44E-10	1.50E 00	9.91E-04	9.53E-09	8.44E-14	9.91E-04	2.43E-10	8.44E-14	2.40E-10
5.0E 00	5.95E-03	2.48E-03	2.30E-11	1.47E-09	2.33E 00	4.96E-03	5.95E-08	4.79E-13	2.48E-03	1.47E-09	4.79E-13	1.45E-09
1.0E 01	2.38E-02	9.95E-03	7.49E-11	5.61E-09	2.67E 00	9.95E-03	2.38E-07	1.65E-12	9.95E-03	5.00E-09	1.65E-12	5.53E-09
2.0E 01	9.53E-02	4.97E-03	2.84E-10	2.03E-08	2.69E 00	4.90E-03	9.50E-07	5.05E-12	4.90E-03	2.03E-08	5.05E-12	2.00E-08
5.0E 01	5.41E-02	2.49E-02	1.30E-09	9.70E-08	2.80E 00	2.47E-02	5.91E-06	1.76E-11	2.47E-02	9.69E-08	1.76E-11	9.56E-08
1.0E 02	2.33E-01	9.93E-02	5.73E-09	2.71E-07	1.13E 00	9.73E-02	2.35E-05	3.94E-11	9.93E-02	2.70E-07	3.94E-11	2.67E-07
2.0E 02	9.20E-01	3.81E-02	2.10E-08	6.50E-07	4.69E-01	3.81E-02	9.20E-05	8.31E-11	3.81E-02	6.50E-07	8.31E-11	6.41E-07
5.0E 02	5.56E-01	2.09E-01	2.52E-08	1.80E-06	2.65E-02	2.42E-01	5.54E-04	2.18E-10	2.42E-01	1.53E-06	2.18E-10	1.77E-06
1.0E 03	2.05E-01	9.71E-01	5.17E-08	3.70E-06	1.97E-04	9.71E-01	2.06E-03	4.37E-10	9.71E-01	3.70E-06	4.37E-10	3.64E-06
2.0E 03	1.23E-03	3.89E-01	1.03E-07	7.52E-06	1.97E-04	3.88E-01	7.23E-03	8.73E-10	3.88E-01	7.52E-06	8.73E-10	7.44E-06
5.0E 03	3.49E-02	1.49E 00	2.53E-07	1.83E-05	2.13E-04	1.49E 00	3.16E-02	2.18E-09	1.49E 00	1.83E-05	2.18E-09	1.80E-05
1.0E 04	3.41E-02	1.42E 00	4.30E-07	3.47E-05	4.37E-04	1.42E 00	3.13E-02	4.37E-09	1.42E 00	3.47E-05	4.37E-09	3.42E-05
2.0E 04	1.78E-02	4.20E 00	8.78E-07	6.20E-05	8.73E-04	4.20E 00	1.75E-01	8.73E-09	4.20E 00	6.20E-05	8.73E-09	6.19E-05
5.0E 04	4.33E-02	4.36E 00	1.03E-06	1.13E-04	2.18E-03	4.36E 00	4.00E-01	2.18E-08	4.36E 00	1.18E-04	2.18E-08	1.17E-04
1.0E 05	8.26E-01	8.98E 00	2.23E-06	1.59E-04	4.30E-03	8.96E 00	6.22E-01	4.30E-08	8.96E 00	1.59E-04	4.30E-08	1.57E-04
5.0E 05	4.14E-01	7.57E-02	2.53E-06	1.80E-04	4.30E-03	7.57E-02	1.14E-01	4.33E-07	7.57E-02	1.80E-04	4.33E-07	1.78E-04
1.0E 06	6.53E-01	9.19E-12	2.53E-06	1.74E-04	3.77E-06	9.19E-12	6.50E-06	3.79E-06	9.19E-12	1.74E-04	3.79E-06	1.76E-04
1.0E 08	2.29E-04	1.05E-29	2.27E-06	1.64E-04	1.42E-05	1.05E-29	6.29E-06	1.42E-05	1.05E-29	1.64E-04	1.42E-05	1.62E-04

YEAR	TH-228	TH-229	TH-230	TH-231	TH-232	TH-234	PA-231	PA-233	PA-234M	PA-234	U-232	U-233
1.0E 00	8.09E-04	4.95E-04	1.10E-05	1.81E-04	4.37E-13	6.39E-06	3.85E-09	2.17E-10	6.39E-06	6.39E-04	2.91E 00	5.22E 00
2.0E 00	1.59E 00	9.90E-04	2.23E-05	1.81E-04	8.73E-13	6.39E-06	7.74E-09	2.17E-10	6.39E-06	6.39E-04	2.88E 00	5.22E 00
5.0E 00	2.38E 00	2.48E-03	5.53E-05	1.81E-04	2.18E-12	6.39E-06	1.93E-08	2.17E-10	6.39E-06	6.39E-04	2.80E 00	5.21E 00
1.0E 01	2.66E 00	4.95E-03	1.11E-04	1.81E-04	4.37E-12	6.39E-06	3.87E-08	2.17E-10	6.39E-06	6.39E-04	2.67E 00	5.21E 00
2.0E 01	2.69E 00	9.90E-03	2.20E-04	1.81E-04	8.73E-12	6.39E-06	7.72E-08	2.17E-10	6.39E-06	6.39E-04	2.42E 00	5.21E 00
5.0E 01	1.80E 00	2.47E-02	5.50E-04	1.81E-04	2.18E-11	6.39E-06	1.93E-07	2.17E-10	6.39E-06	6.39E-04	1.81E 00	5.21E 00
1.0E 02	1.15E 00	4.93E-02	1.10E-03	1.81E-04	4.37E-11	6.39E-06	3.85E-07	2.17E-10	6.39E-06	6.39E-04	1.12E 00	5.21E 00
2.0E 02	4.90E-01	1.81E-02	2.23E-03	1.81E-04	8.73E-11	6.39E-06	7.54E-07	2.17E-10	6.39E-06	6.39E-04	4.26E-01	5.21E 00
5.0E 02	2.95E-02	2.04E-01	5.48E-03	1.81E-04	2.18E-10	6.39E-06	1.92E-06	2.17E-10	6.39E-06	6.39E-04	2.58E-02	5.20E 00
1.0E 03	1.94E-04	4.71E-01	1.09E-02	1.81E-04	4.37E-10	6.39E-06	3.81E-06	2.16E-10	6.39E-06	6.39E-04	1.93E-04	5.19E 00
2.0E 03	1.29E-08	9.43E-01	2.17E-02	1.81E-04	8.73E-10	6.39E-06	7.55E-06	2.16E-10	6.39E-06	6.39E-04	1.27E-08	5.17E 00
5.0E 03	2.14E-04	1.95E 00	5.35E-02	1.81E-04	2.18E-09	6.39E-06	1.88E-05	2.16E-10	6.39E-06	6.39E-04	3.04E-21	5.10E 00
1.0E 04	4.37E-04	3.82E 00	1.04E-01	1.81E-04	4.37E-09	6.39E-06	3.67E-05	2.16E-10	6.39E-06	6.39E-04	4.51E-42	5.00E 00
2.0E 04	8.73E-09	6.20E 00	1.96E-01	1.81E-04	8.73E-09	6.39E-06	6.27E-05	2.15E-10	6.39E-06	6.39E-04	0.0	4.79E 00
5.0E 04	2.14E-08	8.36E 00	4.14E-01	1.81E-04	2.18E-08	6.39E-06	1.18E-04	2.13E-10	6.39E-06	6.39E-04	0.0	4.21E 00
1.0E 05	4.36E-08	3.50E 00	8.27E-01	1.81E-04	4.30E-08	6.39E-06	1.57E-04	2.10E-10	6.39E-06	6.39E-04	0.0	3.40E 00
5.0E 05	2.17E-07	8.43E-01	4.37E-01	1.81E-04	2.17E-07	6.39E-06	1.81E-04	1.98E-10	6.39E-06	6.39E-04	0.0	0.14E-01
1.0E 06	4.33E-07	7.57E-02	1.13E-01	1.80E-04	4.30E-07	6.38E-06	1.90E-04	1.57E-10	6.38E-06	6.38E-04	0.0	7.23E-02
1.0E 07	3.79E-06	9.17E-12	6.53E-05	1.74E-04	3.77E-06	6.38E-06	1.79E-04	8.49E-12	6.38E-06	6.38E-04	0.0	9.10E-12
1.0E 08	1.42E-05	1.05E-29	2.27E-06	1.64E-04	1.42E-05	6.29E-06	1.54E-04	1.05E-29	6.29E-06	6.29E-04	0.0	1.05E-24

Table D9. Cont'd.

Curies Per Kilogram of Recovered Uranium

YEAR	U-234	U-235	U-236	U-237	U-238	NP-237	PU-240
1.0E 00	1.27E 00	1.81E-04	8.88E-03	1.28E-16	8.39E-06	2.17E-10	3.32E-20
2.0E 00	1.27E 00	1.81E-04	8.88E-03	8.58E-35	8.39E-06	2.17E-10	3.32E-20
5.0E 00	1.27E 00	1.81E-04	8.88E-03	0.0	8.39E-06	2.17E-10	3.32E-20
1.0E 01	1.27E 00	1.81E-04	8.84E-03	0.0	8.39E-06	2.17E-10	3.32E-20
2.0E 01	1.27E 00	1.81E-04	8.88E-03	0.0	8.39E-06	2.17E-10	3.32E-20
5.0E 01	1.27E 00	1.81E-04	8.85E-03	0.0	8.39E-06	2.17E-10	3.31E-20
1.0E 02	1.27E 00	1.81E-04	8.84E-03	0.0	8.39E-06	2.17E-10	3.29E-20
2.0E 02	1.27E 00	1.81E-04	8.83E-03	0.0	8.39E-06	2.17E-10	3.26E-20
5.0E 02	1.27E 00	1.81E-04	8.88E-03	0.0	8.39E-06	2.17E-10	3.16E-20
1.0E 03	1.27E 00	1.81E-04	8.88E-03	0.0	8.39E-06	2.16E-10	3.00E-20
2.0E 03	1.26E 00	1.81E-04	8.88E-03	0.0	8.39E-06	2.16E-10	2.71E-20
5.0E 03	1.25E 00	1.81E-04	8.88E-03	0.0	8.39E-06	2.16E-10	1.94E-20
1.0E 04	1.23E 00	1.81E-04	8.88E-03	0.0	8.39E-06	2.16E-10	1.19E-20
2.0E 04	1.20E 00	1.81E-04	8.88E-03	0.0	8.39E-06	2.15E-10	4.26E-21
5.0E 04	1.10E 00	1.81E-04	8.87E-03	0.0	8.39E-06	2.13E-10	2.01E-22
1.0E 05	9.59E-01	1.81E-04	8.86E-03	0.0	8.39E-06	2.10E-10	0.0
5.0E 05	3.12E-01	1.81E-04	8.75E-03	0.0	8.39E-06	1.89E-10	0.0
1.0E 06	7.67E-02	1.80E-04	8.53E-03	0.0	8.38E-06	1.57E-10	0.0
1.0E 07	8.38E-06	1.79E-04	8.84E-03	0.0	8.38E-06	8.49E-12	0.0
1.0E 08	8.29E-06	1.64E-04	4.88E-04	0.0	8.29E-06	1.88E-24	0.0